Chapter 6 – Projects and Strategies to Improve the Movement of Goods

This chapter summarizes the work done under Task 6 to build the Action Plan, that is described further in Tech Memos 6a (Evaluation of Initial Goods Movement Strategies) and 6b (Evaluations of Detailed Goods Movement Strategies). Task 6 included substantial qualitative evaluations and limited modeling to explore a wide range of transportation options that may address the issues and challenges described in Chapters 3, 4 and 5. This chapter provides an analysis of the growth scenarios defined in Chapter 4 and outlines the screening and evaluation process for a broad range of projects and strategies that are under consideration throughout the study region. This chapter also offers insight into the feasibility of dedicated freight facilities and the potential of revenue sources with the understanding that a more detailed analysis of corridors and local community impacts, beyond the scope of this effort, is required.

As defined in Chapter 4, four growth scenarios- Scenario 1: High Growth - Current Investment Level, Scenario 2: Low Growth – Current Investment Levels, Scenario 3: Moderate Growth - Current Investment Levels and Scenario 4: High Growth - Full Investment Levels were analyzed to determine mobility and economic impacts throughout the region. The “current investment levels” specified under Scenarios 1, 2, and 3 represent committed funding plans of the project partners. Under the four scenarios, the study region’s infrastructure and goods movement system would perform differently. When the existing system performance is reviewed, it performs at constrained levels under significant daily and peak hour congestion. If “current investment levels” are maintained, any additional growth in highway and rail volumes will further degrade the system and increase existing environmental and community impacts. Also, if the significant growth in international container cargo is diverted to other Ports or offset by other factors (e.g., changes in trade policy, global unrest), there would still be demand for goods in Southern California given the region’s population and the fact that it is one of the largest consumer markets in the nation..

As discussed in Chapter 3, the volume of containers moving through the Ports of Los Angeles and Long Beach, as well as domestic trade within the region, affects traffic, the economy, the environment, and the overall quality of life of residents throughout the study region. A change to any one component of the supply chain causes a ripple effect that may impact mobility, the economy, and the environment within the study region. For example, Figure 39 provides a summary of the employment impacts of each scenario. As shown, there is a clear relationship between the volume of goods through the ports to the number or jobs created in the region. Therefore, a reduction in trade volume through the ports results in a reduction in jobs created. As noted in Tech Memo 5a, each logistics sector job creates 2.2 new jobs. Therefore, the reduction in employment due to a reduced volume of goods through the port would have indirect and induced impacts on other jobs in the region. Other effects of changes in container volumes through the Ports are more difficult to quantify, given the limitations of existing analytical tools. For instance, goods carried in forty-foot international containers may be brought from the Ports to inland warehousing and/or distribution centers (transloaded intermodal goods) to be separated and moved through the supply chain by rail, truck, or a combination of the two. Trips leaving warehouses or distribution centers can also be called secondary or tertiary truck trips. The exact number and relationship of these “secondary” and “tertiary” trips for each international container is not quantifiable given the current modeling tools. Therefore, there is no way to analyze the full ripple effect caused by changes to Port trade forecasts. For the purposes of this study, the travel demand model used to analyze the impacts of goods movement on the regional transportation system is based on the Port’s growth forecast of 42.5 million TEUs by the Year 2030 (as defined by Scenarios 1 and 4). The model results for Scenarios 1 and 4 are presented later in this chapter.

Figure 39
Freight Growth Scenarios

Scenario	Assumptions	2030 Employment impact (number of jobs)	Change relative to Scenario 1
1	San Pedro Bay port growth of 42.5 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation	1,601,476	-
2	San Pedro Bay port growth of 24 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation	1,013,101	-36.7%
3	San Pedro Bay port growth of 33 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation	1,303,490	-18.6%
4	San Pedro Bay port growth of 42.5 million TEUs by 2030; SCAG 2004 Regional Transportation Plan baseline implementation supplemented by additional projects and private investment sources and fees	1,601,476	0.0%

Evaluation of Goods Movement Projects and Strategies

A qualitative evaluation of goods movement projects/strategies was initially conducted. It was assumed that the projects and strategies set forth in this chapter would require applicable (1) environmental mitigation measures, (2) local support through an EIR/EIS and community participation process, and (3) detailed feasibility studies, as the projects and strategies are in various stages in the project development process.

An initial list of high priority goods movement projects and strategies obtained from the project partners was expanded to include railroad and port projects, intermodal connectors and other short- and near-term projects included in county and regional planning and programming documents, and other projects contained in the California Marine Intermodal Transportation System Advisory Council (CALMITSAC) and the State's Goods Movement Action Plan. This resulted in a broad list of financially unconstrained projects and strategies.

Using the following screening criteria, this list was reduced to a comprehensive list of 249 projects and strategies, shown in Table 7 of Appendix B:

1. Is the project or strategy related to goods movement?
   a. Does it address a direct or indirect component of the goods movement system?
2. Is the project or strategy fully funded and programmed for short- or near-term implementation?
3. Is the project or strategy duplicated or a part of a similar project or strategy?

The comprehensive list of 249 projects and strategies was grouped into 15 categories of projects ranging from increased highway and rail capacity improvements to changes in operational and institutional practices, as shown below.

1. On-Dock Rail Improvements at Ports (projects outside of terminals)
2. Intermodal Facilities / Yards (includes Ports and rail yards)
3. Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals
4. Mainline Rail Capacity Improvements
5. Modification of Port Hours of Operation
6. Modification of Delivery Hours
7. Construction of Dedicated Truck Lanes/Facilities

8. Use of Longer Combination Vehicles (LCVs) on Dedicated Facilities
9. Rail Grade Separations and Grade Crossing Safety Upgrades
10. Application of ITS Technology for Vehicle Management and Routing
11. Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel
12. Data and Analytical Methods
13. Institutional Changes to Improve Feasibility of Large Scale/Mega Projects
14. Construction of Additional Freeway Lanes/Capacity
15. Freeway Operational/Safety Improvements

Data availability and analytical methods is not a specific type of project, but is included in this evaluation to document the need for more data related to the supply chain and the diverse impacts associated with all aspects of goods movement. As stated earlier, the ripple effect of changes in the volume of international goods moving through the Ports of Los Angeles and Long Beach cannot be fully analyzed until there is more data collected for secondary and tertiary trips resulting from each forty-foot international container.

An evaluation criterion was developed for the 15 categories of projects to provide decision-makers with enough information to compare different levels of desired transportation benefits and other relevant factors (e.g., mitigation measures, cost, economic opportunities, etc.). However, this evaluation process was not intended to produce results or draw conclusions about project-specific environmental impacts or cost-benefit analyses.

The 15 categories of projects and strategies were evaluated based on the following 26 criteria:

1. Modal Diversion
2. Highway Congestion/Delay
3. Rail Congestion/Delay
4. Travel Time/Reliability
5. Freight Trip Times - Specific Trade Lanes/Corridors
6. Truck Trips - Transport Corridors
7. Truck Trips - Ports/Intermodal/Warehouse Facilities
8. Truck Traffic Peak/Off-Peak Shares - Transport Corridors
9. Truck Traffic Peak/Off-Peak Shares - Ports/Intermodal/Warehouse Facilities
10. Regional Vehicle Miles of Travel
11. Regional Vehicle Hours of Travel
12. Impact on Adjacent Corridors/Regional Balance
13. Overall Emissions - Transport Corridors:
14. Overall Emissions - Ports/Intermodal/Warehouse Facilities
15. PM Emissions - Transport Corridors
16. PM Emissions - Ports/Intermodal/Warehouse Facilities
17. Health Effects - Transport Corridors
18. Health Effects - Ports/Intermodal/Warehouse Facilities
19. Community Impacts - Transport Corridors
20. Community Impacts - Ports/Intermodal/Warehouse Facilities
21. Land Use Impacts - Transport Corridors
22. Land Use Impacts - Ports/Intermodal/Warehouse Facilities
23. Project Revenue/User Fees:
24. Regional Economic Output/Competitiveness
25. Jobs/Economic Opportunity
26. Cost

To compare how well the categories of projects meet the criteria, a consumer report evaluation was used to differentiate between the categories. In the analysis, circles denoting a range from “least” likely to “most” likely were used to indicate the degree by which the criteria were attained. Table 21 contains a summary of this qualitative evaluation and a description of each evaluation criteria, including a discussion of the “least” and “most” rated projects or strategies.

Each project category was evaluated individually and was assumed to be independent of other categories. Since many of the projects or strategies within the categories complement each other, the cumulative effects of various categories is not shown.

Table 21
Summary of Qualitative Evaluations (Chart 1 of 5)

Least ○ ◔ ◑ ◕ ● Most

Project Category	Modal Diversion	Reduction of Highway Congestion / Delay	Reduction of Rail Congestion / Delay	Improvement of Travel Time / Reliability	Improvement of Freight Trip Times - Specific Trade Lanes / Corridors	Change in Truck Trips - Transport Corridors
On-Dock Rail Improvements at Ports (projects outside of terminals)	●	◑	◑	◔	◕	◔
Intermodal Facilities / Yards	◑	◔	◑	◔	◕	◔
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	◑	◑	◑	◔	●	◔
Mainline Rail Capacity Improvements	◔	◔	●	◕	●	◔
Modification of Port Hours of Operation	○	◔	◔	◔	◔	◔
Modification of Delivery Hours	○	◔	◔	◔	◔	◔
Truck Lanes/Facilities	◔	◑	○	◑	●	●
Use of LCVs on Dedicated Facilities	◔	◑	◔	◔	◔	◔
Rail Grade Separations and Grade Crossing Safety Upgrades	○	◑	○	◔	◔	◔
Application of ITS Technology for Vehicle Management and Routing	○	◔	○	◔	○	◔
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	◑	◔	○	◔	◔	◔
Data and Analytical Methods	○	○	○	◔	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◑	◕	◕	◑	◑	◕
Construction of Additional Freeway Lanes/Capacity	○	◑	○	◔	◕	◕
Freeway Operational/Safety Improvements	○	◔	○	◔	◑	◑

Table 21
Summary of Qualitative Evaluations (Chart 2 of 5)

○ ◔ ◑ ◕ ● Least ⟷ Most **Project Category**	**Change in Truck Trips - Ports / Intermodal / Warehouse Facilities**	**Change in Truck Traffic Peak / Off-Peak Shares - Transport Corridors**	**Change in Truck Traffic Peak / Off-Peak Shares - Ports / Intermodal / Warehouse Facilities**	**Reduction of Regional Vehicle Miles of Travel**	**Reduction of Regional Vehicle Hours of Travel**
On-Dock Rail Improvements at Ports (projects outside of terminals)	◑	○	○	◔	◔
Intermodal Facilities / Yards	◕	○	○	◔	◔
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	◔	○	○	◑	◑
Mainline Rail Capacity Improvements	◔	○	○	◔	◔
Modification of Port Hours of Operation	◔	◑	◑	◔	◔
Modification of Delivery Hours	◔	◑	◑	◔	◔
Truck Lanes/Facilities	●	●	●	●	●
Use of LCVs on Dedicated Facilities	◔	◕	◕	◕	◕
Rail Grade Separations and Grade Crossing Safety Upgrades	◔	○	○	○	○
Application of ITS Technology for Vehicle Management and Routing	◔	◔	◔	○	○
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	◔	◔	◔	○	○
Data and Analytical Methods	○	○	○	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◕	○	○	◕	◕
Construction of Additional Freeway Lanes/Capacity	◕	◔	◔	◕	◕
Freeway Operational/Safety Improvements	◑	◔	◔	◑	◑

Table 21
Summary of Qualitative Evaluations (Chart 3 of 5)

○ ◔ ◑ ◕ ●

Least ⟷ Most

Project Category	Impact on Adjacent Corridors / Regional Balance	Reduction of Overall Emissions - Transport Corridors	Reduction of Overall Emissions - Ports / Intermodal / Warehouse Facilities	Reduction of PM Emissions - Transport Corridors	Reduction of PM Emissions - Ports / Intermodal / Warehouse Facilities	Improved Health Effects - Transport Corridors
On-Dock Rail Improvements at Ports (projects outside of terminals)	◔	◑	◕	◑	◕	◑
Intermodal Facilities / Yards	◔	◔	◕	◔	◕	◔
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	◕	●	●	●	●
Mainline Rail Capacity Improvements	◔	◕	◑	●	◑	●
Modification of Port Hours of Operation	◔	◔	◔	◔	◔	◔
Modification of Delivery Hours	◔	◔	◔	◔	◔	◔
Truck Lanes/Facilities	●	◕	◕	◕	◕	◕
Use of LCVs on Dedicated Facilities	◕	◕	◕	◕	◕	◕
Rail Grade Separations and Grade Crossing Safety Upgrades	○	◔	◔	◔	◔	◔
Application of ITS Technology for Vehicle Management and Routing	◔	○	○	○	○	○
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	○	○	○	○	○	○
Data and Analytical Methods	○	○	○	○	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◕	◕	◕	◕	◕	◕
Construction of Additional Freeway Lanes/Capacity	◑	◑	◔	◑	◔	◑
Freeway Operational/Safety Improvements	◑	◑	◔	◑	◔	◑

Table 21

Summary of Qualitative Evaluations (Chart 4 of 5)

○ ◔ ◑ ◕ ●

Least ⟷ Most

Project Category	Improved Health Effects - Ports / Intermodal / Warehouse Facilities	Reduction of Community Impacts - Transport Corridors	Reduction of Community Impacts - Ports / Intermodal / Warehouse Facilities	Reduction of Land Use Impacts - Transport Corridors	Reduction of Land Use Impacts - Ports / Intermodal / Warehouse Facilities
On-Dock Rail Improvements at Ports (projects outside of terminals)	◕	◑	◕	◑	◕
Intermodal Facilities / Yards	◕	◔	◕	◔	◕
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	●	●	●	●
Mainline Rail Capacity Improvements	◑	●	◑	●	◑
Modification of Port Hours of Operation	◔	◔	◔	◔	◔
Modification of Delivery Hours	◔	◔	◔	◔	◔
Truck Lanes/Facilities	◕	◕	◕	◕	◕
Use of LCVs on Dedicated Facilities	◕	◕	◕	◕	◕
Rail Grade Separations and Grade Crossing Safety Upgrades	◔	◔	◔	◔	◔
Application of ITS Technology for Vehicle Management and Routing	○	○	○	○	○
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	○	○	○	○	○
Data and Analytical Methods	○	○	○	○	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◕	◕	◕	◕	◕
Construction of Additional Freeway Lanes/Capacity	◔	◑	◔	◑	◔
Freeway Operational/Safety Improvements	◔	◑	◔	◑	◔

Table 21
Summary of Qualitative Evaluations (Chart 5 of 5)

○ ◔ ◑ ◕ ●

Least ↔ Most

Project Category	Maximization of Project Revenue / User Fees	Improvement of Regional Economic Output / Competitiveness	Increase in Jobs / Economic Opportunity	Cost
On-Dock Rail Improvements at Ports (projects outside of terminals)	◔	◕	◕	●
Intermodal Facilities / Yards	◔	◕	◕	●
Shuttle Trains / Alternative Technologies to Additional Intermodal Terminals	●	◕	◕	●
Mainline Rail Capacity Improvements	◕	◕	◕	●
Modification of Port Hours of Operation	●	◑	◑	○
Modification of Delivery Hours	●	◑	◑	○
Truck Lanes/Facilities	◕	◕	◕	●
Use of LCVs on Dedicated Facilities	◑	◕	◕	◔
Rail Grade Separations and Grade Crossing Safety Upgrades	◔	◕	◕	●
Application of ITS Technology for Vehicle Management and Routing	◔	◔	◔	◔
Operational Techniques Employed by Private or Public Sector to Optimize Freight Travel	○	◕	◕	○
Data and Analytical Methods	○	◕	◕	○
Institutional Changes to Improve Feasibility of Large Scale/Mega Projects	◕	◕	◕	○
Construction of Additional Freeway Lanes/Capacity	◔	◑	◑	●
Freeway Operational/Safety Improvements	◔	◑	◑	◑

SUMMARY OF QUALITATIVE EVALUATION

1. **Modal Diversion:** How much does the project or strategy shift freight from truck to rail?
    a. The **most** significant modal diversion would occur with increased on-dock rail at the ports, with additional potential to increase modal diversion from improvements linking intermodal and freight yards through capital or operational improvements.
    b. The **least** significant modal diversion would occur with projects focused on improving the movement of trucks and passenger vehicles.
        i. The biggest constraint to the movement of goods is intermodal lift capacity. Shifting freight from trucks to rail will require increased capacities and systems to allow more goods to quickly transfer from various modes (intermodal lifts); thereby minimizing the interim drayage truck movements.

2. **Highway Congestion/Delay:** How much will the project or strategy reduce highway congestion and delay for both passenger and freight movement?
    a. The **most** significant reduction in highway congestion/delay would result from large scale/mega projects (such as a regional dedicated freight guideway system) to link the primary origins and destinations in the goods movement system and separate movements between those locations from other regional travel. Therefore, the institutional changes to allow for large scale/mega projects are shown to have the most reduction.
        i. It is important to note that these institutional changes alone would not affect highway congestion or delay; however, for the purposes of this study it is assumed that these institutional changes are the necessary first-step towards implementation of these large scale/mega projects. The planning, design, construction, and operation of such large scale/mega projects would not occur without the required institutional changes.
    b. Minimal reductions in highway congestion/delay would result from smaller scale improvements to the regional highway system (e.g., "spot" fixes instead of a large scale regional system).
        i. The regional highway system is currently at capacity and is forecast to continue to be capacity constrained. The passenger and freight traffic on the existing system is diffuse and extensive; solutions with the greatest benefit must be large scale and separate the traffic that travels through or leaves the region from the traffic within the region.
        ii. Truck lanes would provide a medium reduction in highway congestion and delay, with the greatest change evident to the trucks themselves. The changes to congestion and delay for vehicles traveling in the mixed-flow lanes adjacent to the truck lanes would be minimal, as the excess capacity created by the removal of truck traffic would be quickly absorbed by the significant additional vehicle demand along corridors. In addition, the reduction to highway congestion and delays would be limited to areas on or surrounding the designated truck lane corridors; within the MCGMAP region, highway congestion and delay would remain significant due to overwhelming demand.

3. **Rail Congestion/Delay:** How much will the project or strategy reduce rail congestion and delay for both passenger and freight movement?
    a. The **most** significant reduction in rail congestion/delay would result from mainline rail capacity increases, with additional reduction from large scale/mega projects.
    b. The **least** significant reduction in rail congestion/delay would result from those projects and strategies that do not affect rail travel.
        i. Rail capacity is the second largest constraint to the goods movement system. Additional mainline rail is necessary to improve capacity.

4. **Travel Time/Reliability:** How much will the project or strategy improve travel time and reliability for both passenger and freight movement?
    a. The **most** significant improvement in travel time/reliability would result from additional mainline rail capacity; both for passenger and goods movement.
    b. The **least** significant improvement in travel time/reliability would result from improvements to the regional highway system or modifications to operational systems.
        i. The goods movement network in the region shares capacity with passenger and freight traffic. The sheer demand for passenger service results in a highly constrained system. Although improvements to the regional network would improve travel time and reliability, the improvements may not be as substantial as desired due to the demand on the system from both passengers and freight.

5. **Freight Trip Times - Specific Trade Lanes/Corridors:** How much will the project or strategy improve trip time for freight movement?
    a. The **most** significant improvement in freight trip times along specific trade lanes/corridors would result from direct capacity enhancements to the specific trade lanes/corridors; with rail representing the area for maximum benefit.
    b. Limited benefit in freight trip times along specific trade lanes/corridors would result from projects and strategies not directly adding capacity.
        i. Since the majority of the goods movement within the region moves on a broad and diverse system, the most benefit would occur when improvements are made to specific goods movement corridors. (e.g., rail lines).
        ii. Corridor improvements will reduce freight trip times along specific corridors, but regionwide changes will be negligible, as corridor improvements also allow for a greater number of vehicle volumes to be served, further constraining capacity and reducing travel times.
6. **Truck Trips - Transport Corridors:** How much will the project or strategy increase truck trips along transport corridors?
    a. The **most** significant change in truck trips along transport corridors would result from the addition of truck lanes or facilities; with additional potential from the construction of additional mainline freeway capacity.
    b. Limited change in truck trips along transport corridors would result from projects and strategies not directly adding capacity or those that focus on rail goods movement.
        i. The region's highway system serves local, regional, and national goods movement via trucks; therefore, improvements to the region's highway system will change truck trips, and the most change would result from a dedicated system serving trucks. The best solutions will most likely require a large scale / mega project.

7. **Truck Trips - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy increase truck trips between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant increase in truck trips between ports, intermodal yards, and warehouse facilities would result from the addition of truck lanes or facilities; with additional potential from the construction of additional mainline freeway capacity as well as improvements and increases to intermodal facilities and yards.
    b. Limited increase in truck trips between ports, intermodal yards, and warehouse facilities would result from projects and strategies not directly adding capacity or those that focus on rail goods movement.
        i. Similar to transport corridors, the most change to truck trips between ports, intermodal yards, and warehouse facilities would result from a dedicated system serving trucks; improvements to on-dock rail and increases to intermodal facilities and yards would also change truck trips, specifically drayage truck trips associated with transloaded intermodal cargo.

8. **Truck Traffic Peak/Off-Peak Shares - Transport Corridors:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times along transport corridors?
    a. The **most** significant shift in the share of truck traffic from peak to off-peak times along transport corridors would result from the addition of truck lanes or facilities; with additional potential benefits from the use of LCVs on dedicated facilities.
    b. The **least** significant shift in the share of truck traffic from peak to off-peak times along transport corridors would result from any improvements to rail capacity.
        i. The greatest shift in peak and off-peak truck travel along transport corridors would result from increased opportunities for trucks to either travel during peak hours, congestion on dedicated facilities with limited congestion (e.g., truck lanes), or to allow increased volumes to travel during off-peak times (e.g., changes to operating hours).

9. **Truck Traffic Peak/Off-Peak Shares - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy shift the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant shift in the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities would result from the addition of truck lanes or facilities; with additional potential benefits from the use of LCVs on dedicated facilities.
    b. The **least** significant shift in the share of truck traffic from peak to off-peak times between ports, intermodal yards, and warehouse facilities would result from any improvements to rail capacity.
        i. The greatest shift in peak and off-peak truck travel between ports, intermodal yards, and warehouse facilities would result from increased opportunities for trucks to either travel during peak hours of congestion on dedicated facilities with limited congestion (e.g., truck lanes) or to allow increased volumes to travel during off-peak times (e.g., changes to operating hours).

10. **Regional Vehicle Miles of Travel:** How much will the project or strategy reduce regional vehicle miles of travel?
    a. The **most** significant reduction in regional VMT would result from the addition of truck lanes or facilities; with additional potential benefit from the addition of mainline freeway capacity.
    b. Limited reduction in regional VMT would result from any improvements to rail capacity.
        i. By concentrating truck travel along specific corridors, total congestion could be reduced resulting in changes to travel routes and an overall reduction in VMT; this would occur through capacity enhancements to the region's highway system.
        ii. Note that the MCGMAP Region's overall VMT will maintain a relatively constant level with any assumed highway or rail projects described in this chapter or Tech Memo 6a. As a function of total lane-miles of roadway and total vehicle volumes on the regional system, total VMT will show minimal changes when considering projects and strategies located along specific routes or corridors. The qualitative evaluations presented above reflect nominal differences between the least and most reduction. The key point of this qualitative evaluation is that the greatest reduction in VMT would occur through enhancements to the highway system that allow for vehicles to utilize the most direct routes between destinations, without selecting routes based on reduced congestion levels (thereby reducing overall miles traveled). Rail capacity improvements would serve a specific segment of the MCGMAP Region's goods moved by truck; however, a greater share of the Region's trucks would not be affected by rail capacity improvements and therefore the reduction in VMT would be limited.

11. **Regional Vehicle Hours of Travel:** How much will the project or strategy reduce regional vehicle hours of travel?
    a. The **most** significant reduction in regional VHT would result from the addition of truck lanes or facilities; with additional potential benefit from the addition of mainline freeway capacity.
    b. The **least** significant reduction in regional VHT would result from any improvements to rail capacity.
        i. By concentrating truck travel along specific corridors, total congestion could be reduced resulting in an overall reduction in VHT; this would occur through capacity enhancements to the region's highway system.

12. **Impact on Adjacent Corridors/Regional Balance:** How much will the project or strategy impact adjacent corridors or change the regional balance of passenger and goods movement?
    a. The **most** significant impact on adjacent corridors or regional balance would result from projects and strategies that enhance specific goods movement routes or corridors (such as dedicated truck facilities or advanced technologies).
    b. Limited impact on adjacent corridors or regional balance would result from operational improvements or location-specific improvements.
        i. By providing enhanced capacity along specific goods movement corridors or routes, goods movement traffic would be more likely to shift from adjacent corridors, while non-goods movement traffic may shift to the adjacent corridors; the net result would be noticeable changes to regional balance.

13. **Overall Emissions - Transport Corridors:** How much will the project or strategy reduce overall emissions along transport corridors?
    a. The **most** significant reduction to overall emissions along transport corridors would result from alternative technologies (e.g., low- or zero-emission technologies) and improvements to the speed and congestion of goods movement throughout the region.
    b. The **least** significant reduction to overall emissions along transport corridors would result from those improvements not enhancing capacity, congestion, and travel speeds.
        i. The key to reducing overall emissions along transport corridors is either maximizing the volume of low- or zero-emission vehicles (e.g., maximize the volume of goods carried by rail or "clean" emerging technologies) or by reducing congestion and delays throughout the regional system for both passenger and freight travel.
        ii. Note that the changes to overall emissions would be centered along the specific corridors utilized by the specific project or strategy; within the MCGMAP Region there would still be significant overall emissions related to both goods movement and other sources (e.g., automobiles, stationary sources).

14. **Overall Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce overall emissions between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant reduction to overall emissions between ports, intermodal yards, and warehouse facilities would result from alternative technologies (e.g., non-diesel sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.
    b. The **least** significant reduction to overall emissions between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. Similar to transport corridors, the most reduction to overall emissions between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional

benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g., reducing wait times and bottlenecks at intermodal yards).

ii. Also similar to transport corridors, the changes to overall emissions between ports, intermodal yards, and warehouse facilities would be centered on the facilities accessed by the specific project or strategy; within the MCGMAP Region there would still be significant overall emissions related to both goods movement and other sources (e.g., automobiles, stationary sources).

15. **PM Emissions - Transport Corridors:** How much will the project or strategy reduce diesel particulate matter emissions along transport corridors?
    a. The **most** significant reduction to PM emissions along transport corridors would result from alternative technologies (e.g., non-diesel sources) and a shift from truck to rail.
    b. The **least** significant reduction to PM emissions along transport corridors would result from those improvements not enhancing capacity, congestion, and travel speeds.
        i. The key to reducing PM emissions along transport corridors is maximizing non-diesel technologies (e.g., maximize the volume of goods carried by rail or “clean” emerging technologies).
        ii. Note that the changes to PM emissions would be centered along the specific corridors utilized by the specific project or strategy; within the MCGMAP region there would still be significant PM emissions related to goods movement along other routes.

16. **PM Emissions - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce diesel particulate matter emissions between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant reduction to PM emissions between ports, intermodal yards, and warehouse facilities would result from the use of alternative technologies (e.g., non-diesel sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.
    b. The **least** significant reduction to PM emissions between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. Similar to transport corridors, the most reduction to PM emissions between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g., reducing wait times and bottlenecks at intermodal yards).
        ii. Also similar to transport corridors, the changes to PM emissions between ports, intermodal yards, and warehouse facilities would be centered on the facilities accessed by the specific project or strategy; within the MCGMAP Region there would still be significant PM emissions related to goods movement along other routes.

17. **Health Effects - Transport Corridors:** How much will the project or strategy improve health effects (or reduce the current negative health effects) of goods movement along transport corridors?
    a. The **most** significant improvement in health effects (or reduction in current negative health effects) of goods movement along transport corridors would result from the use of alternative technologies (e.g., non-diesel sources); with additional potential benefits from increased on-dock rail improvements and improvements to the speed and congestion of goods movement throughout the region.
    b. The **least** significant improvement in health effects (or reduction in current negative health effects) of goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.

    i. By reducing the volume or congestion of truck traffic along transport corridors, alternative "clean" technologies can be implemented to improve health effects.

18. **Health Effects - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy improve health effects (or reduce the current health effects) of goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant improvement in health effects (or reduction in current negative health effects) of goods movement between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.
    b. The **least** significant improvement in health effects (or reduction in current negative health effects) of goods movement between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. The most improvement in health effects between ports, intermodal yards, and warehouse facilities would be through the implementation of a low- or zero-emission technology to move goods between the specific locations; with additional benefits from increased on-dock rail at the ports and improvements to intermodal yard efficiency (e.g., reducing wait times and bottlenecks at intermodal yards).

19. **Community Impacts - Transport Corridors:** How much will the project or strategy reduce community impacts associated with goods movement along transport corridors?
    a. The **most** significant reduction in community impacts associated with goods movement along transport corridors would result from those projects that allow for more goods to move on systems separated from communities.
    b. The **least** significant reduction in community impacts associated with goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.
        i. By increasing rail mainline capacity, more trucks could be removed from local communities; also, dedicated truck facilities can separate truck traffic from passenger traffic and direct truck traffic to specific routes to separate from local traffic.
        ii. The evaluation assumes that the benefits of increased rail mainline capacity will offset the impacts; for example, the benefits due to reduced truck volumes, noise, congestion, and emissions would offset (or outweigh) community impacts associated with increased rail mainline capacity, such as increased noise and need for additional right-of-way.
        iii. In addition, the community impacts of goods movement occur along entire routes and are not unique to transport corridors. Therefore, improvements to a transport corridor may lessen community impacts in one designated segment, while having no effect on, or increasing, community impacts at the end- or mid-points of the corridor. Increased freight volumes along improved separated corridors could also lead to increased community impacts at the end- or mid-points where loading and transloading occur.

20. **Community Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.

b. The **least** significant reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
    i. The most significant reduction in community impacts associated with goods movement between ports, intermodal yards, and warehouse facilities would be through the clear separation of goods movement systems and the local system, thereby reducing truck trips and/or truck congestion.
    ii. The evaluation assumes that the benefits of separating the goods movement system from the local system will offset the impacts; for example, the benefits due to reduced truck volumes, noise, congestion, and emissions would offset (or outweigh) community impacts associated with separated facilities, such as increased noise and need for additional right-of-way.
    iii. In addition, the community impacts of goods movement occur along entire routes and are not unique to ports, intermodal yards, and warehouse facilities. Therefore, improvements to the ports, intermodal yards, and warehouse facilities may lessen community impacts in one designated area, while having no effect on, or increasing, community impacts along the corridor. Increased freight volumes along improved separated corridors could also lead to increased community impacts at the end- or mid-points where loading and transloading occur.

21. **Land Use Impacts - Transport Corridors:** How much will the project or strategy reduce land use impacts associated with goods movement along transport corridors?
    a. The **most** significant reduction in land use impacts associated with goods movement along transport corridors would result from those projects that allow for more goods to move on systems separated from communities.
    b. The **least** significant reduction in land use impacts associated with goods movement along transport corridors would result from those improvements not reducing congestion or truck trips.
        i. By increasing rail mainline capacity coupled with grade separations, more trucks could be removed from local communities; also, dedicated truck facilities can separate truck traffic from passenger traffic and direct truck traffic to specific routes to separate from local traffic.

22. **Land Use Impacts - Ports/Intermodal/Warehouse Facilities:** How much will the project or strategy reduce land use impacts associated with goods movement between ports, intermodal yards, and warehouse facilities?
    a. The **most** significant reduction in land use impacts between ports, intermodal yards, and warehouse facilities would result from reducing truck trips and/or truck congestion; with additional potential benefits from improved efficiency at the ports and intermodal yards.
    b. The **least** significant reduction in land use impacts between ports, intermodal yards, and warehouse facilities would result from those improvements not enhancing capacity or congestion.
        i. The most significant reduction in land use impacts between ports, intermodal yards, and warehouse facilities would be through the clear separation of goods movement systems and the local system, thereby reducing truck trips and/or truck congestion.

23. **Project Revenue/User Fees:** How much will the project or strategy maximize project revenue or user fee generating potential?
    a. The **most** significant project revenue or user fee generating potential would result from those projects and strategies that target specific market segments of the goods movement system (e.g., national distribution).
    b. The **least** significant project revenue or user fee generating potential would result from those projects and strategies that do not serve a specific market segment or need.

i. In order to maximize project revenues and user fees, the users must see a direct benefit in terms of productivity, reliability, efficiency, or another metric of performance.

24. **Regional Economic Output/Competitiveness:** How much will the project or strategy improve the economic output and competitiveness of the region?
    a. The **most** significant improvement to the economic output and competitiveness of the region would result from projects and strategies that maintain the system for the movement of goods and associated industries throughout the region and state, as well as nationally and internationally.
    b. The **least** significant improvement to the economic output and competitiveness of the region would result from projects and strategies that do not specifically maintain or enhance the goods movement system.
        i. In general, the region will maintain its competitive economic edge due to a number of factors (e.g., access to Asian trade, role as international gateway, large manufacturing base, large population base).

25. **Cost:** What is the overall cost of the project or strategy?
    a. The **most** costly projects and strategies are those that would require large capital expenditures (e.g., right-of-way acquisition, structures) as well as those projects and strategies requiring extensive regional environmental mitigation.
    b. The **least** costly projects and strategies are those that would not require new capital expenditures.
        i. The costs for any projects and strategies will be substantial; however, the cost can be offset by improvements in the other 25 categories mentioned above.
        ii. Note that it is difficult to prepare an equitable assessment of costs between all evaluated projects and strategies. For the purposes of this evaluation, any project or strategy that would require right-of-way acquisition (e.g., along specific transport corridors, around existing facilities) was assumed to have the most cost. Although specific costs will vary between the projects and strategies, and some projects and strategies will be substantially less cost than others or could present opportunities for cost savings (e.g., using existing utility easements for new corridor alignments), all projects or strategies requiring right-of-way acquisition will have high costs.

26. **Jobs/Economic Opportunity:** How much will the project or strategy increase the number of jobs and economic opportunity associated with goods movement in the region?
    a. The **most** significant increase in the number of jobs and economic opportunity associated with goods movement in the region would result from projects and strategies that maintain the system for the movement of goods and associated industries throughout the region and state, as well as nationally, and internationally.
    b. The **least** significant increase in the number of jobs and economic opportunity associated with goods movement in the region would result from projects and strategies that do not specifically maintain or enhance the goods movement system.
        i. In general, the region will maintain its competitive economic edge due to a number of factors (e.g., access to Asian trade, role as international gateway, large manufacturing base, large population base). This will ensure an increase in jobs and economic opportunity; however, the region must ensure that appropriate training and opportunity is continually provided.

Detailed Evaluation of Goods Movement Strategies

In addition to the qualitative evaluations set forth in this chapter, a more detailed analysis was conducted for four of the 15 categories of projects and strategies: 1) construction of dedicated truck lanes/facilities with or without tolls 2) shuttle trains / alternative technologies to additional intermodal terminals, 3) construction of additional freeway lanes, HOV lanes/capacity, and 4) freeway operational/safety improvements. This analysis focused on projects and strategies that would result in changes to regional vehicle and truck travel characteristics. Also, the projects and strategies would have to be quantified and evaluated using analytical tools (such as regional travel demand models, economic models, and GIS tools). In addition, estimates of potential revenue generation from tolls and container fees were developed, and cost estimates were prepared for the construction of dedicated truck lanes. The projects described in this section have not undergone detailed environmental clearance.

Projects and strategies that could be modeled using SCAG's regional travel demand model were grouped into "bundles and summarized below:

1. Lowest investment, consisting of strategic freeway widening, bottleneck relief, auxiliary lanes, interchange improvements on freeways carrying heavy flows of truck traffic.
    a. Note that the projects included in Bundle 1 are primarily taken from SCAG's 2004 RTP and represent non-truck lane improvements not included under existing committed funding plans. For the purposes of this project, no additional non-truck lane improvements are included in this bundle. Therefore, this bundle is classified as strategic improvements, as they address already identified areas of concern.
2. I-710 (Ports to SR-60), SR-60 (I-710 to I-15), and I-15 (SR-60 to Victorville) dedicated truck lanes (2 lanes in each direction) without tolls.
3. I-710 (Ports to I-10), I-10 (I-710 to I-15), and I-15 (I-10 to Victorville) dedicated truck lanes (2 lanes in each direction) without tolls.
4. I-710 (Ports to SR-91), SR-91 (I-710 to I-15), and I-15 (SR-91 to Victorville) dedicated truck lanes (2 lanes in each direction) without tolls.
5. I-710 (Ports to I-10), two Westbound truck lanes I-10 (I-710 to I-15), two Eastbound truck lanes SR-60 (I-710 to I-15), two Northbound truck lanes I-15 (SR-60 to I-10), I-15 (I-10 to Victorville) dedicated truck lanes (2 lanes in each direction, unless otherwise noted) without tolls.
6. I-710 (Ports to SR-91), SR-91 (I-710 to SR-57), SR-57 (SR-91 to SR-60), SR-60 (SR-57 to I-15), and I-15 (SR-91 to Victorville) dedicated truck lanes (2 lanes in each direction) without tolls.
7. I-710 (Ports to SR-91), SR-91 (I-710 to I-605), I-605 (SR-91 to I-10), I-10 (I-605 to I-15), and I-15 (I-10 to Victorville) dedicated truck lanes (2 lanes in each direction) without tolls.
8. I-5 (I-710 to Kern County) dedicated truck lanes (2 lanes in each direction) without tolls.
9. I-5 (U.S./Mexico Border to Kern County) dedicated truck lanes (2 lanes in each direction) without tolls.
10. Mixed-flow toll expressways (2 lanes in each direction) for autos and light trucks.
11. Alternative technologies (e.g., Shuttle Trains, Maglev) to move goods between POLA/POLB and inland destinations.
12. I-15 (U.S./Mexico Border to Victorville) without tolls.

Model Results

TRAVEL MODEL- Given the congestion of the regional transportation network under Year 2030 baseline conditions, any additional capacity would improve mobility along any route or freeway segment. The application of the travel demand model is consistent with this understanding. For each of the 12 bundles, network improvements were made to the Year 2030 baseline network (representing projects included under the committed funding plans of MCGMAP project partners, or Scenarios 1, 2, and 3) consistent with the specific bundles. The SCAG travel demand forecasting model was then used to evaluate system performance under each of the bundles. This included an iterative process of running the travel demand model vehicle assignment mode a number of times.

The truck and vehicle volumes shown in Figures 40 through 51, represent one component of future systems performance under the project bundles. For the purposes of this project, volume data is used as the primary source for comparison of bundles. The travel demand model allocates vehicle and truck volumes along routes based on available capacity and documented regional travel patterns between origins and destinations; changes in volumes are indicative of changes in congestion level and system performance. As shown in Figure 52, each bundle would result in changes to daily hours of delay for all users of the region's transportation network.

LAND USE- A strong link between proximity of schools and residences to goods movement transportation corridors, facilities and operations, and public health has been documented. Therefore, the bundles were evaluated based on (1) the number of schools and amount of residential land uses, (2) the connectivity to regional centers of goods movement activity (e.g., ports, warehouses, and distribution centers), and (3) the amount of warehouse/distribution land uses adjacent to bundle routes.

The land use analysis was performed using GIS tools based on existing land use data for the study region compiled by SCAG. The land use analysis focused on:

Proximity to schools and residential land uses-

- Number of schools within one third mile (radial) of the bundle route.
- Acreage of residential land use within one half mile (radius) of the bundle route.
    - These distances are based on recent studies showing increased risk of health effects due to residents and schools adjacent to goods movement corridors.

Connectivity to warehouse/distribution land uses.

- Acreage of warehouse/distribution land use within one mile (radial) of the bundle route.
    - For the purposes of this analysis, one mile was selected as a reasonable distance for developing direct or limited access routes to the proposed facilities.

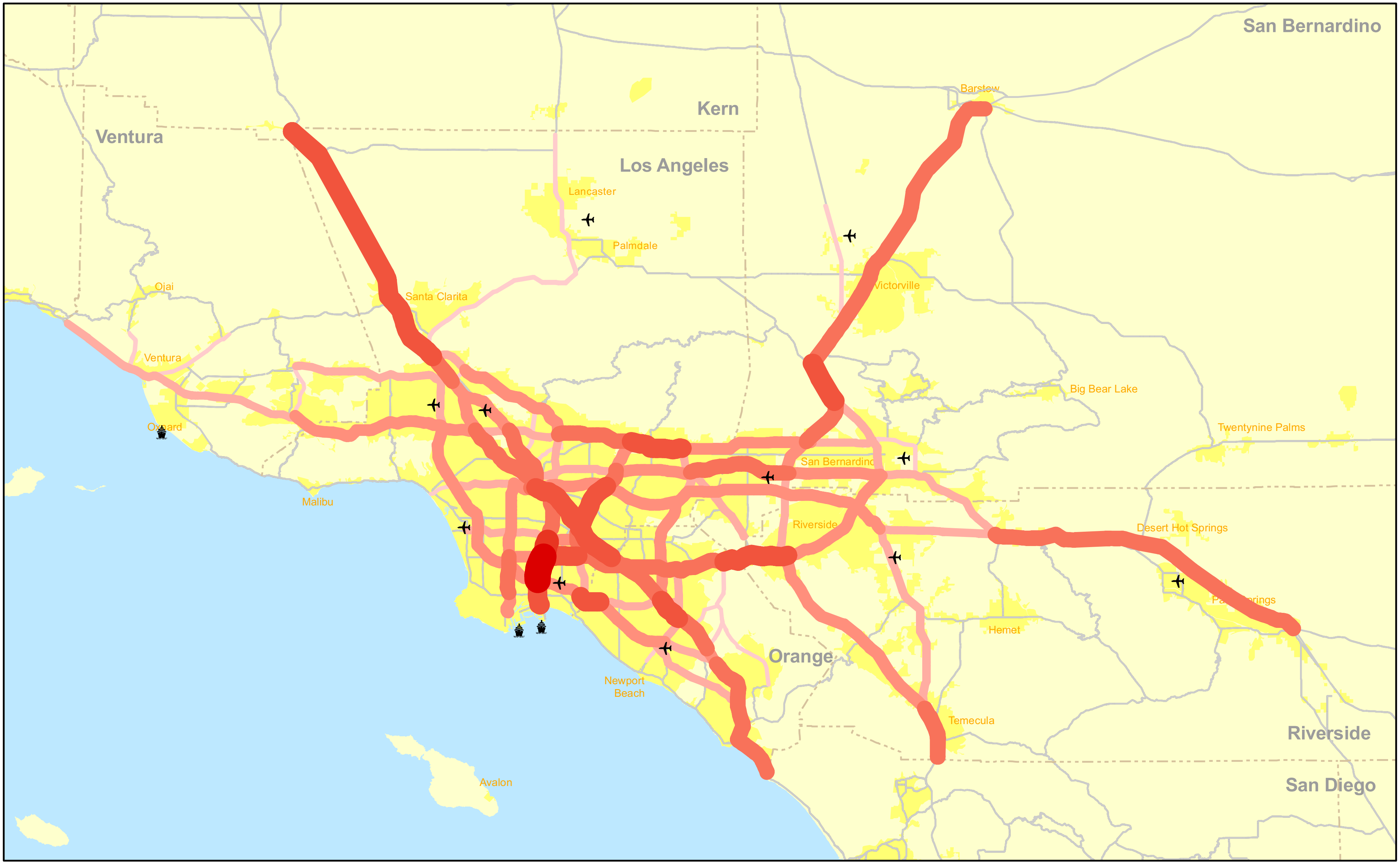


Figure 40

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 1

Lowest Investment/Strategic Improvements

0 5 10 20 30 40 Miles

WilburSmith Associates
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

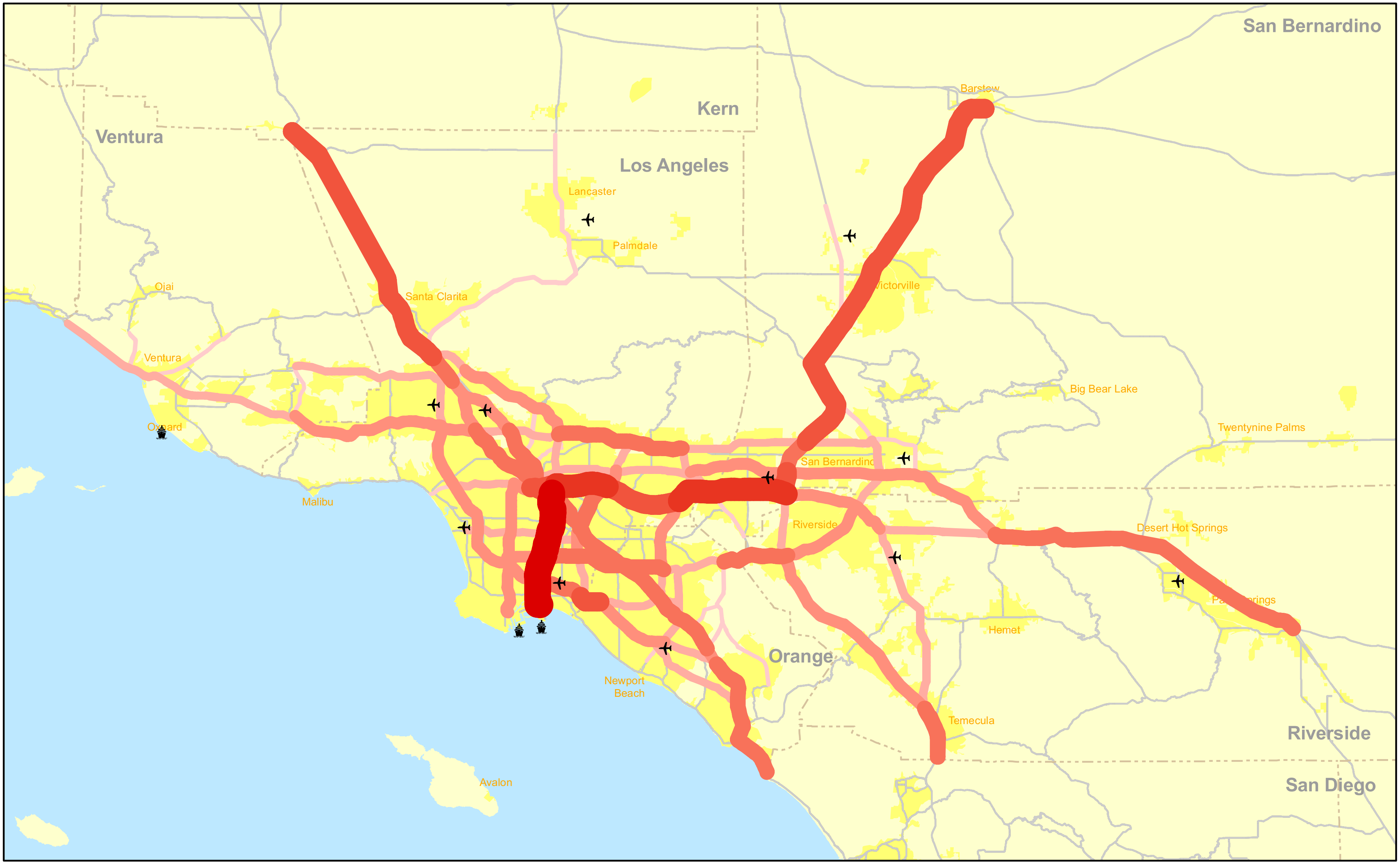


Figure 41

Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

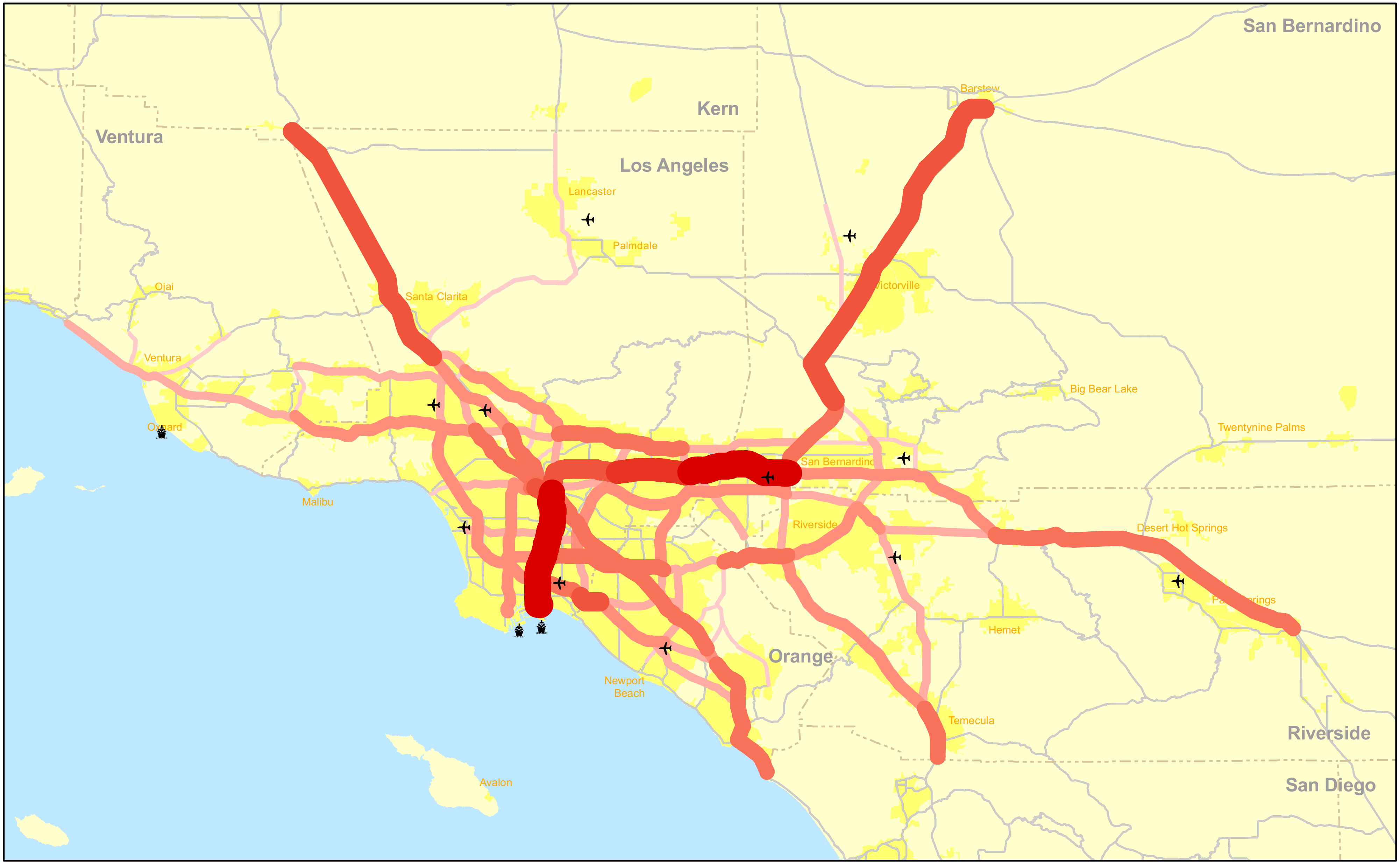
Year 2030 Truck Volumes (Daily)

Bundle 2 Truck Lanes

710 > 60 > 15

0 5 10 20 30 40 Miles

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 3 Truck Lanes

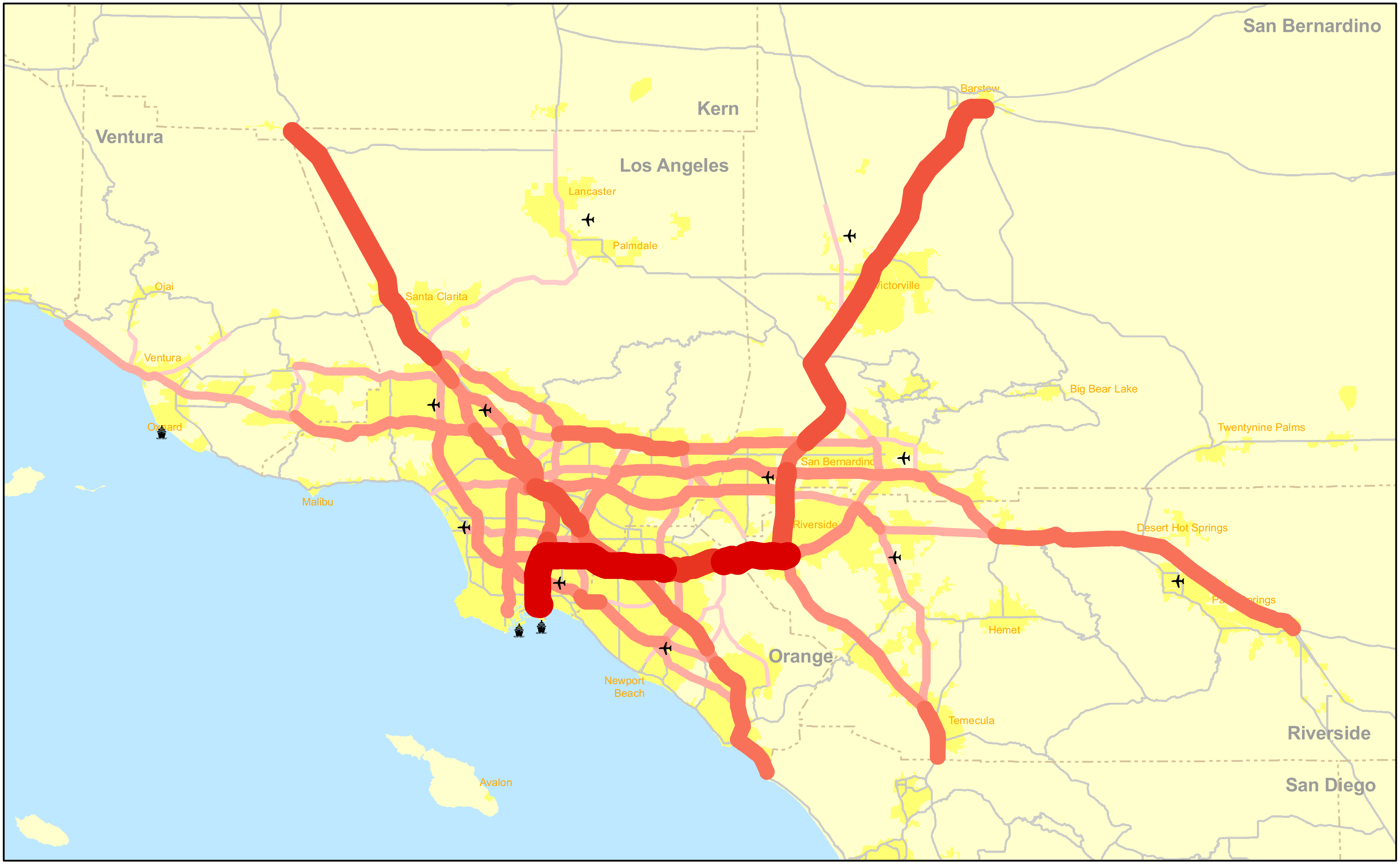
710 > 10 > 15

0 5 10 20 30 40 Miles

Figure 42

WilburSmith

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 4 Truck Lanes

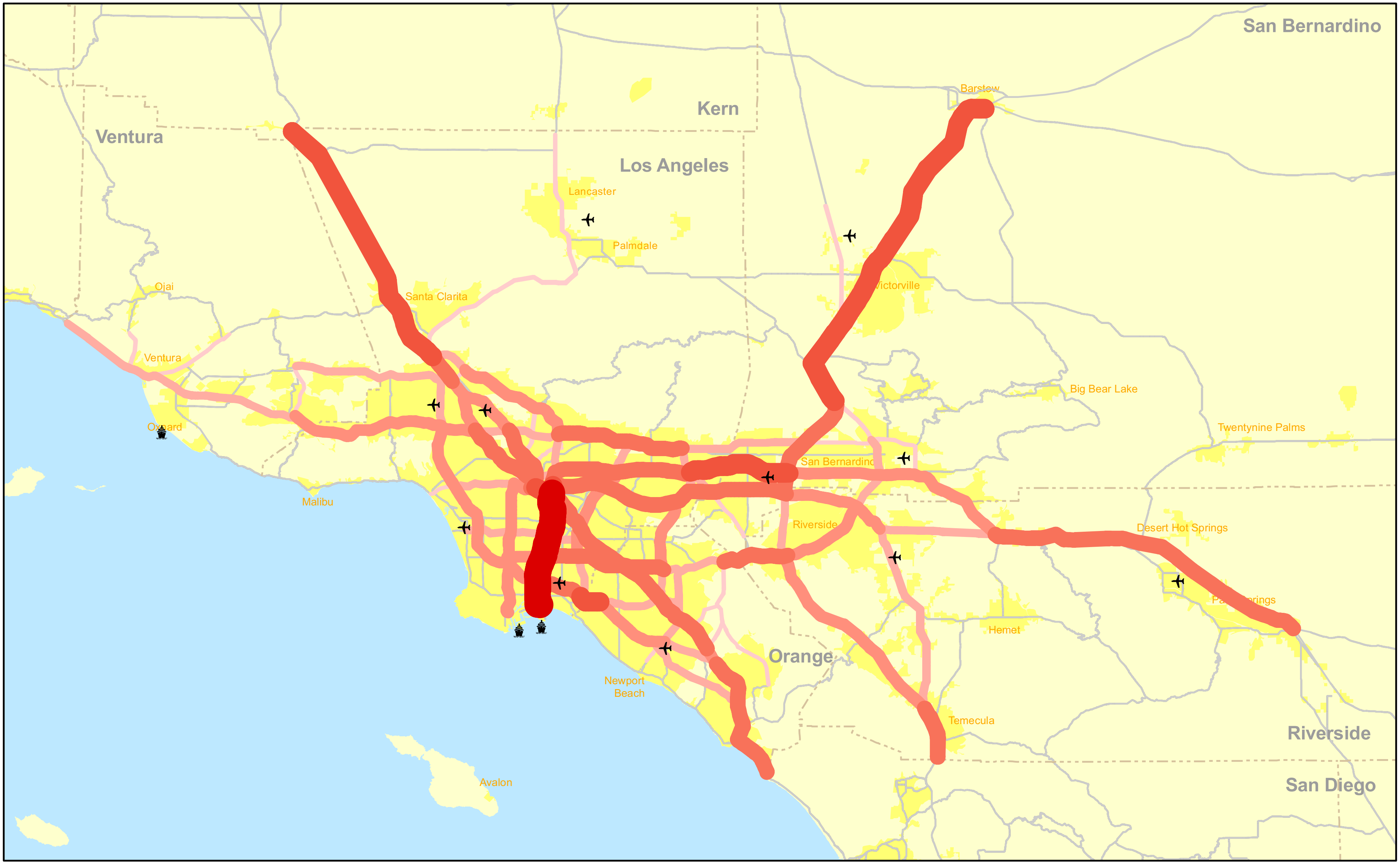
710 > 91 > 15

0 5 10 20 30 40 Miles

Figure 43

WilburSmith

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 5 Truck Lanes

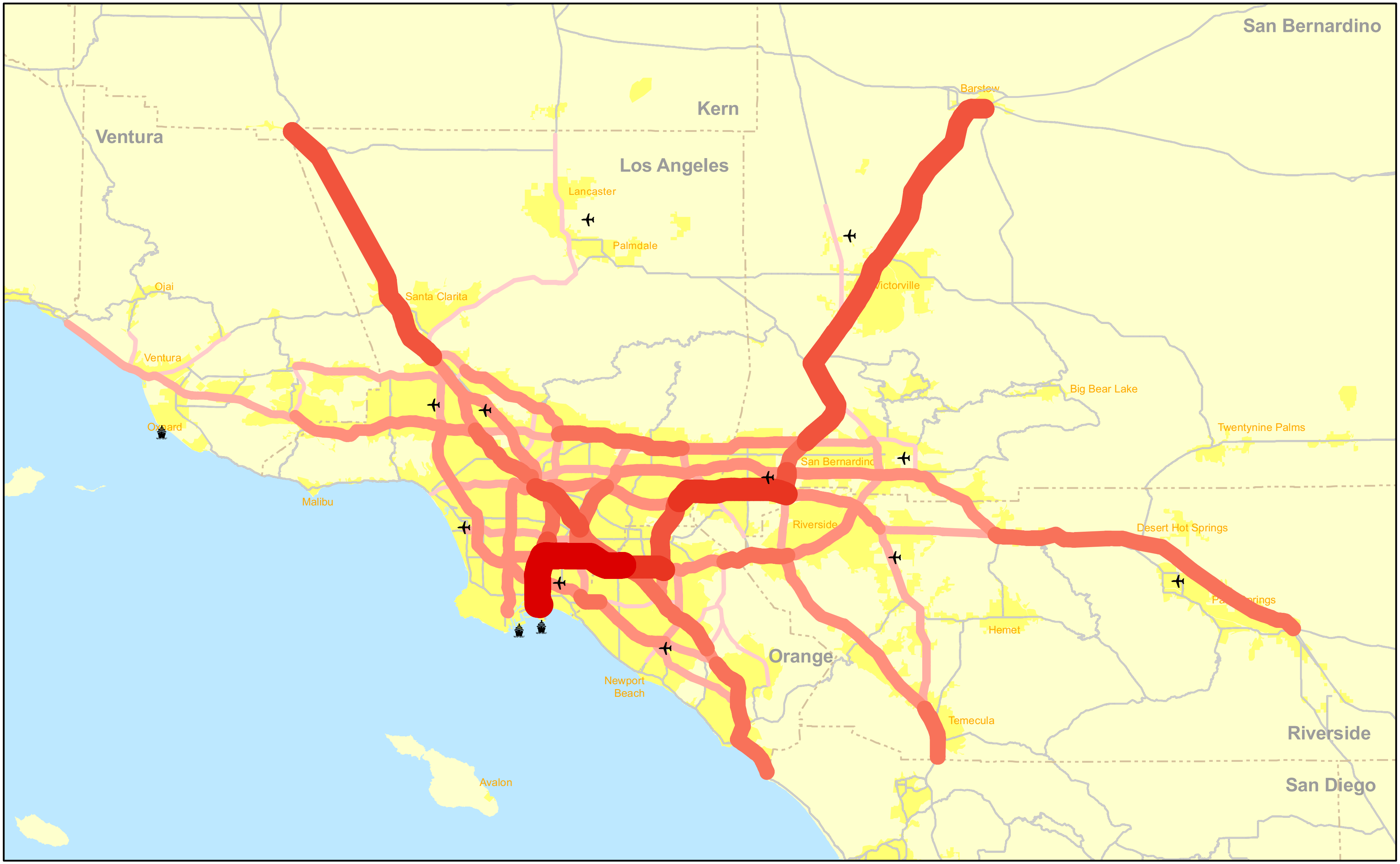
710 > 60 EB > 10 WB > 15

0 5 10 20 30 40 Miles

Figure 44

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 6 Truck Lanes

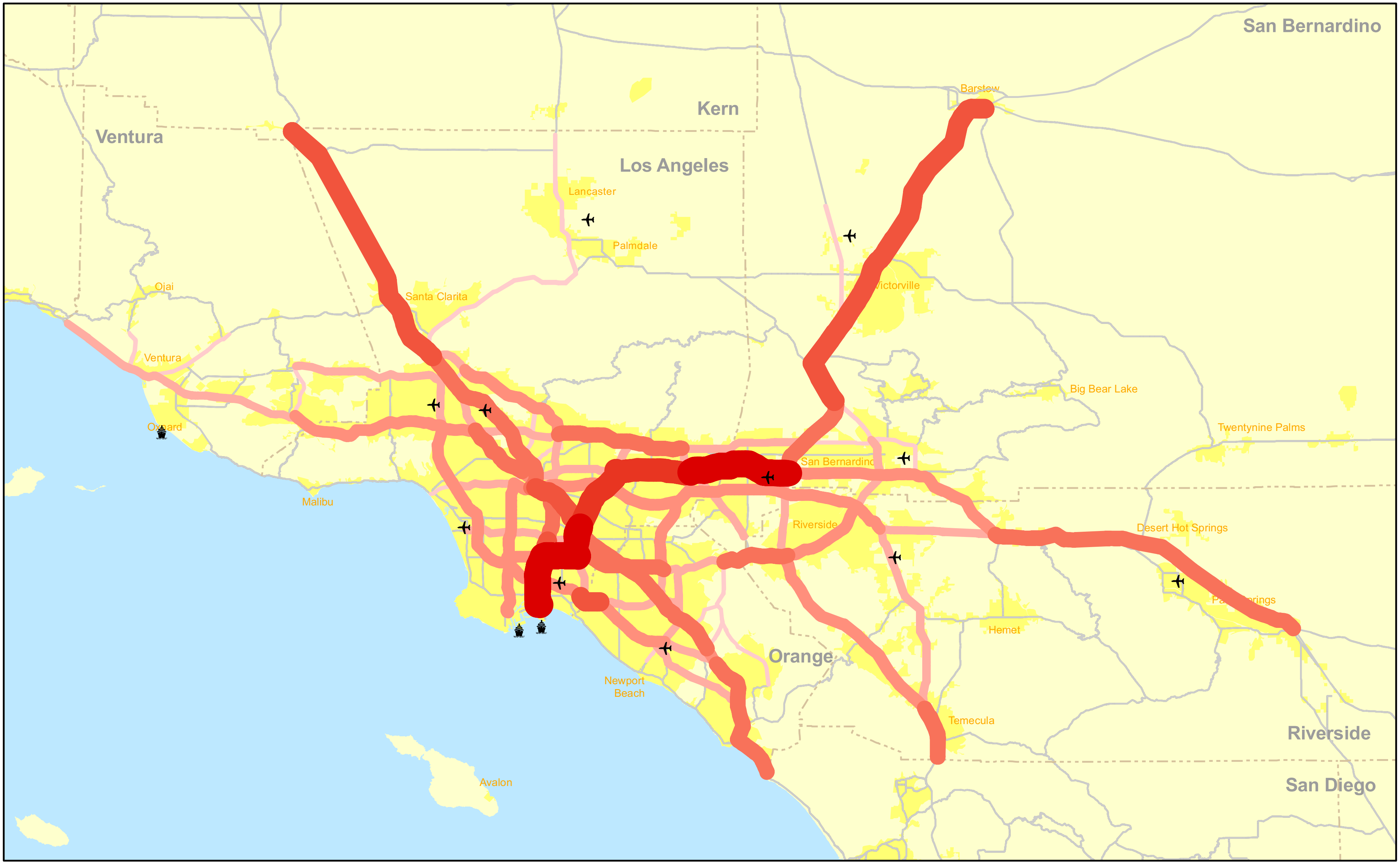
710 > 91 > 57 > 60 > 15

0 5 10 20 30 40 Miles

Figure 45

WilburSmith ASSOCIATES

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary | Other Highways | Water | Urban Areas | Ports | Airports

Year 2030 Truck Volumes (Daily)

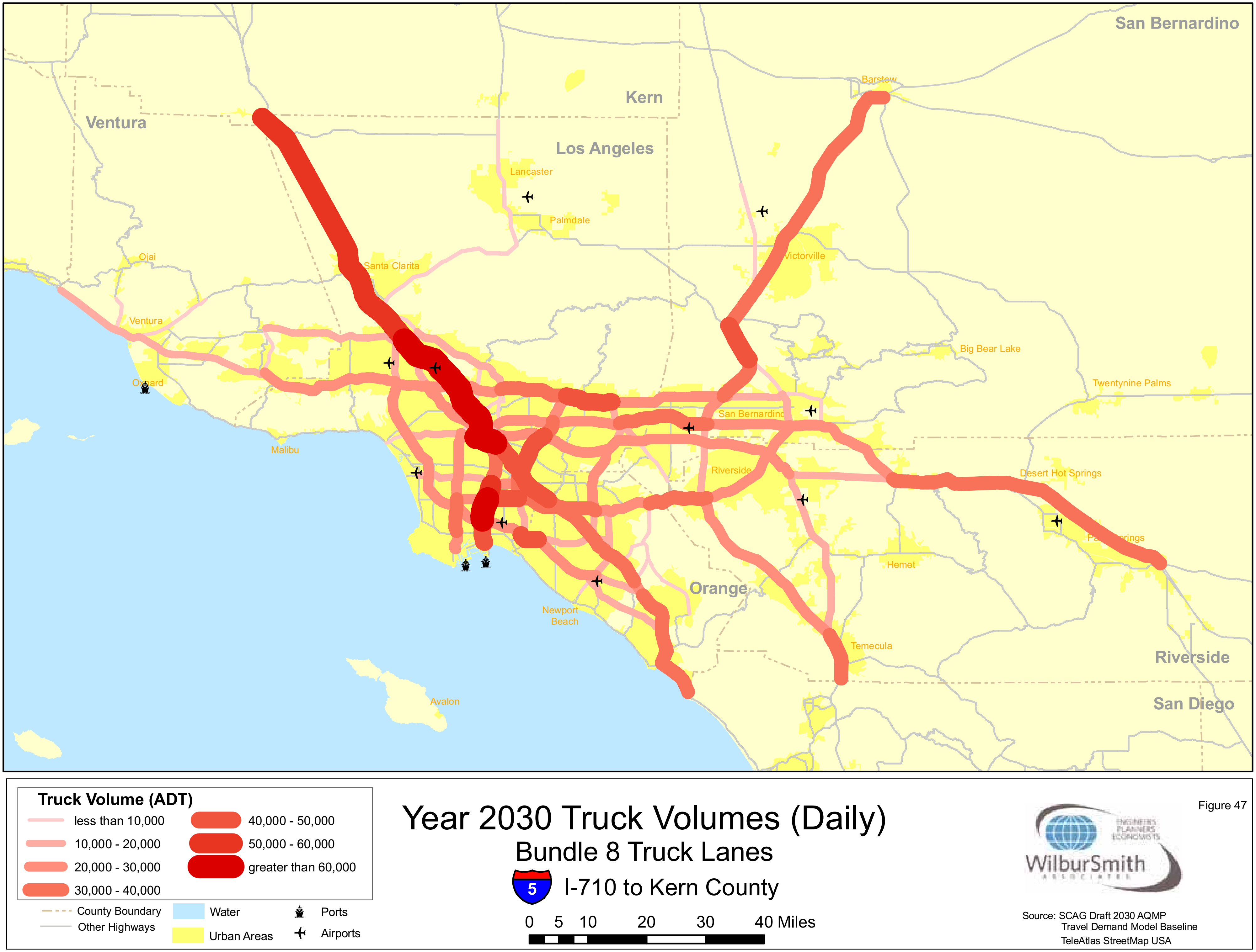
Bundle 7 Truck Lanes

710 > 91 > 605 > 10 > 15

0 5 10 20 30 40 Miles

Figure 46

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Year 2030 Truck Volumes (Daily)

Bundle 8 Truck Lanes

I-710 to Kern County

Figure 47

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

Figure 48

Truck Volume (ADT)

less than 10,000	40,000 - 50,000
10,000 - 20,000	50,000 - 60,000
20,000 - 30,000	greater than 60,000
30,000 - 40,000	

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

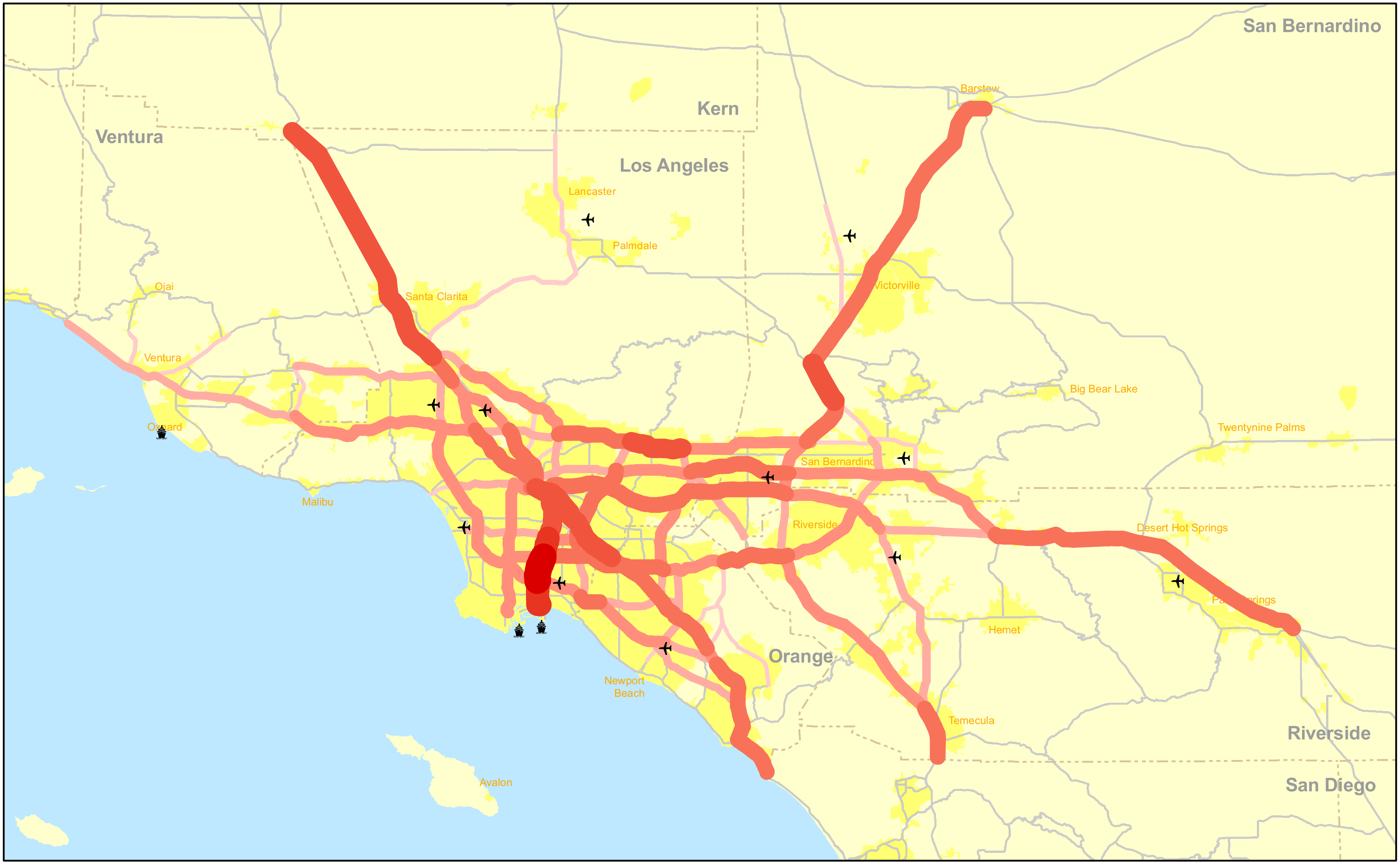
Bundle 9 Truck Lanes

5 Mexico to Kern County

0 5 10 20 30 40 Miles

WilburSmith

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Year 2030 Truck Volumes (Daily)

Bundle 10 Mixed Flow Toll

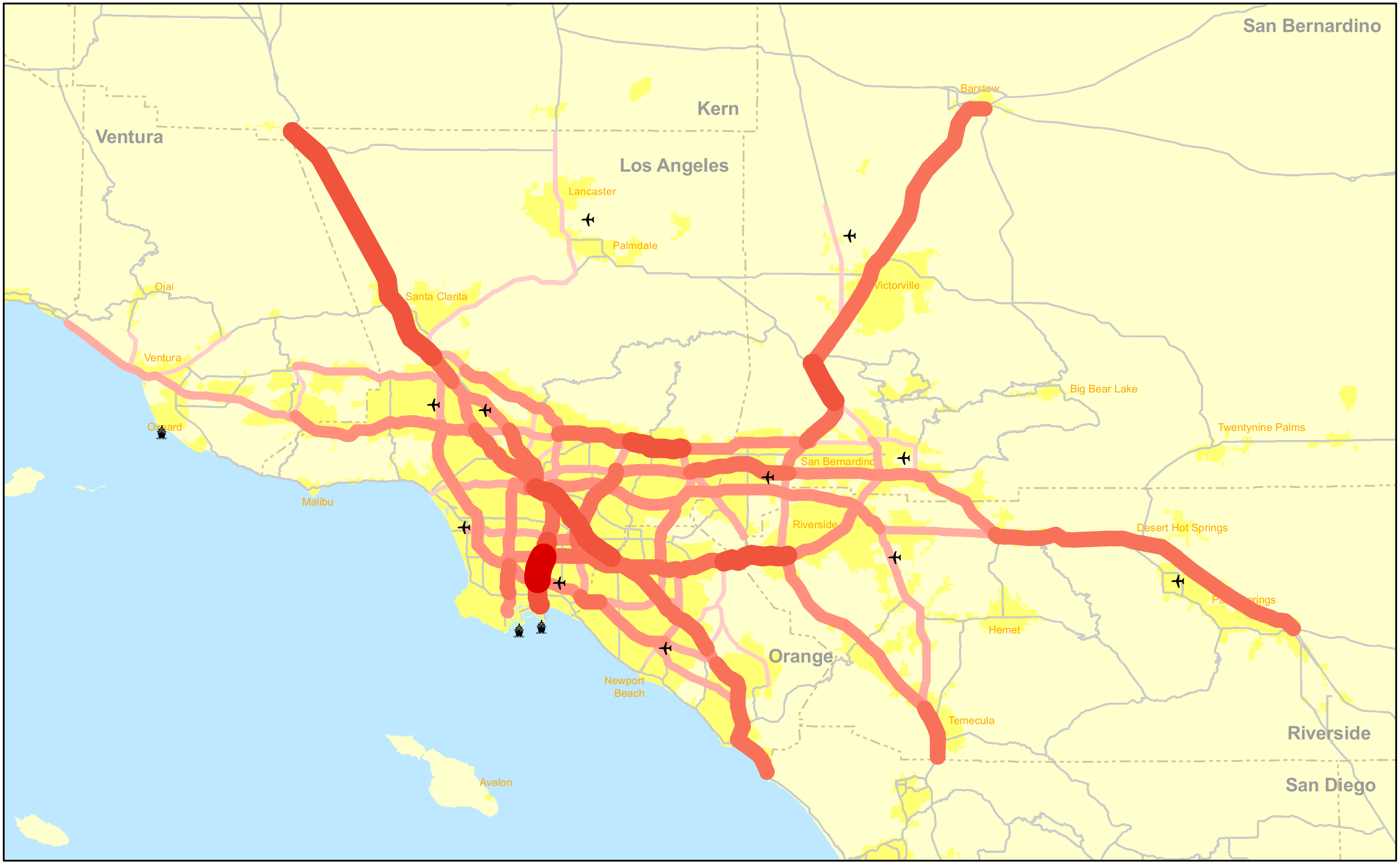
710 > 60 > 15

0 5 10 20 30 40 Miles

Figure 49

WilburSmith

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)

- less than 10,000
- 10,000 - 20,000
- 20,000 - 30,000
- 30,000 - 40,000
- 40,000 - 50,000
- 50,000 - 60,000
- greater than 60,000

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 11 Advanced Technology

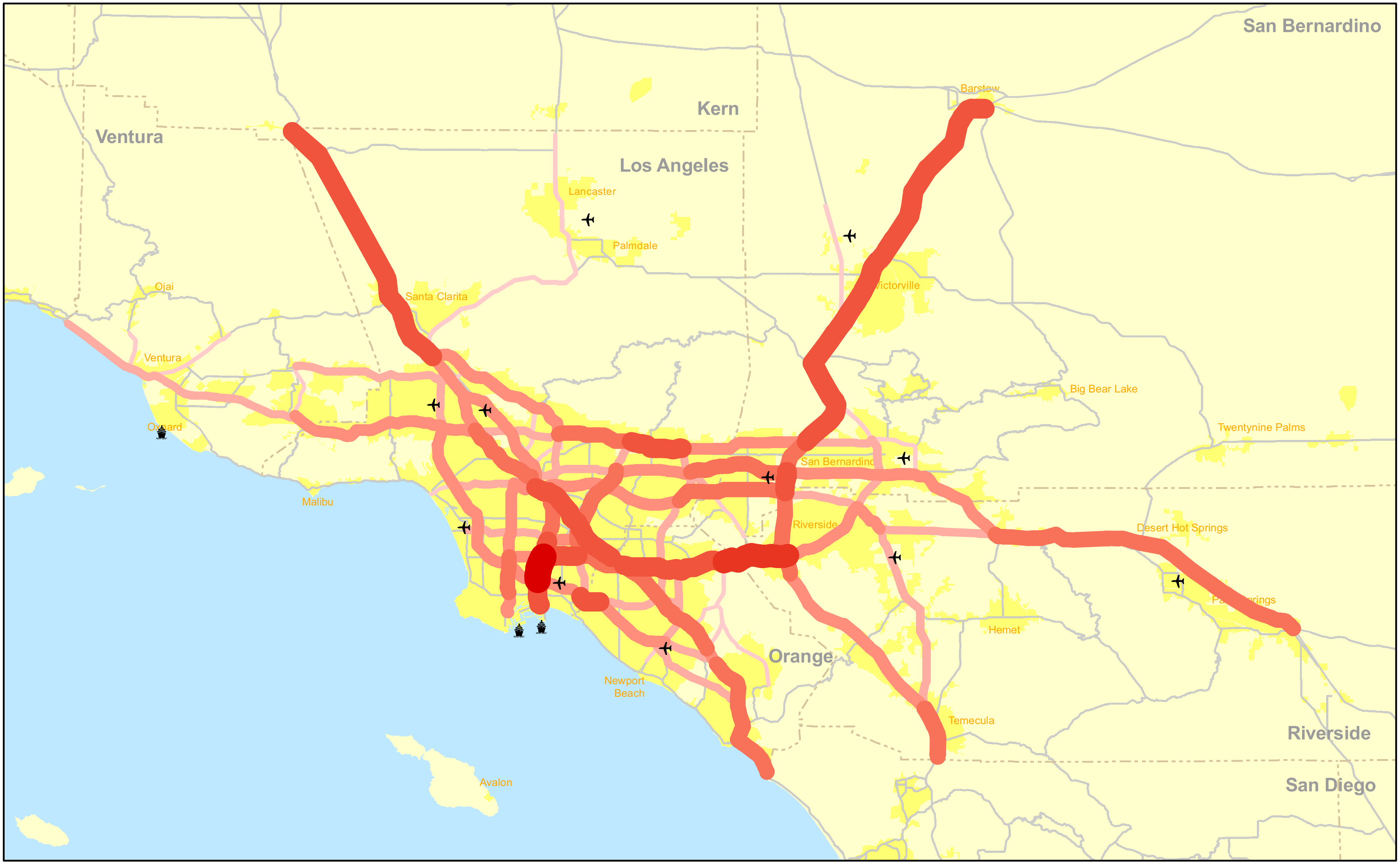
Reducing Port Truck Related Volumes

0 5 10 20 30 40 Miles

Figure 50

WilburSmith ASSOCIATES
ENGINEERS PLANNERS ECONOMISTS

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA



Truck Volume (ADT)	
less than 10,000	40,000 - 50,000
10,000 - 20,000	50,000 - 60,000
20,000 - 30,000	greater than 60,000
30,000 - 40,000	

County Boundary
Other Highways
Water
Urban Areas
Ports
Airports

Year 2030 Truck Volumes (Daily)

Bundle 12 Truck Lanes

15 Mexico to Victorville

0 5 10 20 30 40 Miles

WilburSmith

Figure 51

Source: SCAG Draft 2030 AQMP
Travel Demand Model Baseline
TeleAtlas StreetMap USA

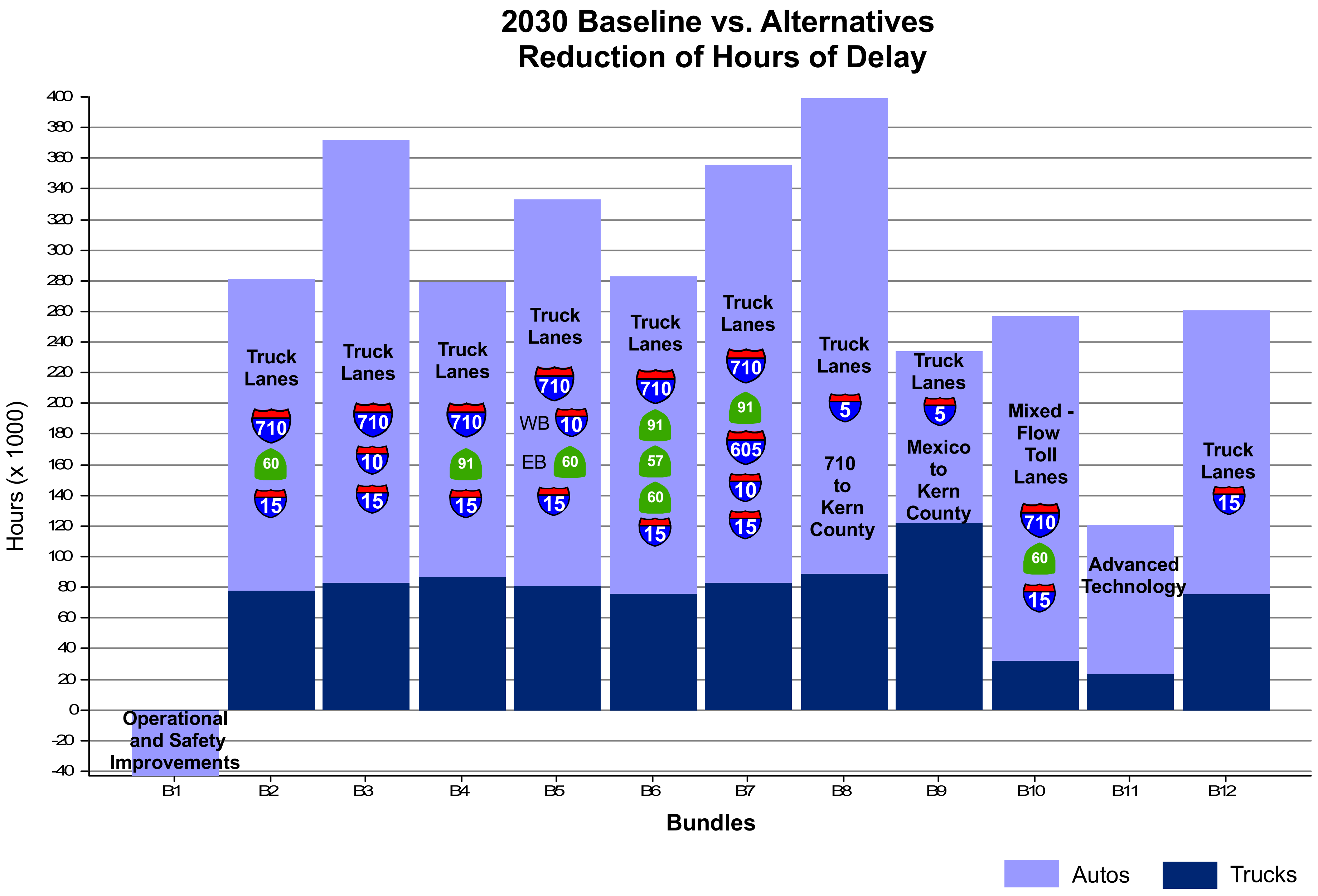

2030 Baseline vs. Alternatives
Reduction of Hours of Delay
Hours (x 1000)
400
380
360
340
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
-20
-40
Operational and Safety Improvements
Truck Lanes
710
60
15
Truck Lanes
710
10
15
Truck Lanes
710
91
15
Truck Lanes
710
WB 10
EB 60
15
Truck Lanes
710
91
57
60
15
Truck Lanes
710
91
605
10
15
Truck Lanes
5
710 to Kern County
Truck Lanes
5
Mexico to Kern County
Mixed - Flow Toll Lanes
710
60
15
Advanced Technology
Truck Lanes
15
B1
B2
B3
B4
B5
B6
B7
B8
B9
B10
B11
B12
Bundles
Autos
Trucks

Figure 52

A summary of the results of the bundle analysis is shown in Table 22. When interpreting this table the following items are worth noting again:

- All bundles were modeled using a container forecast volume of 42.5 million TEUs by 2030, due to the limitations of the analytical tools available,
- All analyses were completed on a regional scale and future detailed corridor-specific analyses and outreach to affected communities and stakeholders is required prior to project implementation,
- Future detailed analysis should quantify factors not included in this analysis such as local economic impacts (e.g., related health care costs, lost revenue or tax base), design, right-of-way (e.g., number of displaced properties, impact on commercial properties adjacent to corridors, other incompatible landuse impacts, etc.),
- The macro-level analysis of dedicated truck lane systems/freight systems, advanced technology and other bundles rendered preliminary information that warrant further investigation and study.

Table 22
MCGMAP Bundle Analysis Results

Bundle	Description	Distance (mi)	Reduction of Daily Hours of Delay (vs. 2030 Baseline)		Schools*	Residential* (Acres)	Warehouse* (Acres)
			Autos	Trucks			
1	Operational and safety improvements	N/A	-42,000	-1,000	N/A	N/A	N/A
2	I-710 to SR-60 to I-15	101.5	203,000	78,000	35	9,933	6,290
3	I-710 to I-10 to I-15	98.7	289,000	83,000	60	11,329	3,135
4	I-710 to SR-91 to I-15	87.5	192,000	87,000	48	8,684	4,716
5	I-710 to I-10 (WB) / SR-60 (EB) to I-15	100.1	252,000	81,000	77	16,702	6,767
6	I-710 to SR-91 to SR-57 to SR-60 to I-15	110	207,000	76,000	41	10,533	5,057
7	I-710 to SR-91 to I-605 to I-10 to I-15	96.1	273,000	83,000	57	11,177	2,691
8	I-5 (I-710 to Kern County)	74.6	347,000	89,000	31	4,979	579
9	I-5 (U.S./Mexico Border to Kern County)	204.6	112,000	122,000	78	12,806	3,054
10	Mixed-flow toll expressways: I-710 > SR-60 > I-15	101.5	225,000	32,000	35	9,933	6,290
11	Alternative technologies (e.g., Shuttle Trains, Maglev) between POLA/POLB and inland destinations	N/A	98,000	23,000	N/A	N/A	N/A
12	I-15 (U.S./Mexico Border to Victorville)	161.7	185,000	76,000	23	5,500	3,151

Note: Negative values indicate an increase in hours of delay.
*Data does not include San Diego County information.

Potential Revenue

TOLLING- An analysis of revenue generation potential of a truck lane system that includes an east-west connection between I-710 and I-15 under tolling scenarios was performed. The bundles containing this east-west connection between I-710 and I-15 were selected based on a clear linkage between origins (the Ports) and destinations (Inland warehousing/distribution centers). National experience with tolling systems indicate tolling operations may succeed if there are distinct origins and destinations for toll facility users, and users experience improved operations and system performance. All tolling analyses were performed external to SCAG's travel demand model, so the analysis was not able to evaluate changes in vehicle volumes and trip characteristics (e.g., the output of the tolling analysis could not be input into SCAG's travel demand model and then reevaluated under SCAG's model). As shown on Table 23, the greatest potential for revenue occurs when a toll rate of $0.20, $0.40, and $0.60 per mile is applied to light- (LHDT), medium- (MHDT), and heavy-duty trucks (HHDT), respectively.

Table 23
Potential Toll Revenue Generation Year 2030
for a Truck Lane System that Includes an East-West Connection between I-710 and I-15

Toll Rate ($LHDT / $MHDT / $HHDT)	Annual Revenue ($millions)					
	Bundle 2	Bundle 3	Bundle 4	Bundle 5	Bundle 6	Bundle 7
.10/.20/.30	199.5	197.8	177.0	199.7	177.9	185.0
.15/.30/.45	240.4	239.4	215.3	241.3	213.6	224.1
.20/.40/.60	255.0	254.3	231.1	256.5	226.5	239.4
.25/.50/.75	253.1	250.5	230.1	253.5	222.3	236.5
.30/.60/.90	245.1	242.6	223.9	242.7	213.5	225.3

An evaluation of the use of longer combination vehicles (LCV) was also conducted as a subset of the toll revenue analysis. The FHWA defines two particular types of LCV configurations: A "Triple Short" and a "Double Long" that could carry 50 percent and 100 percent more tonnage, respectively, than standard truck units. A Triple Short LCV combination consists of a tractor and three trailers in tow, typically three 28 to 28.5 foot trailers. The Double Short (also known as the Turnpike Double) consists of a truck-tractor towing two long trailers of equal length, typically two 48 or 53 foot trailers. A total of 14 states have provisions for LCV use and are included in this study: Alaska, Arizona, Colorado, Idaho, Montana, Nebraska, Nevada, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming[1]. LCVs are not permitted in California. There is also significant local opposition to the use of LCV's on local roadways in the study area[2]. This opposition creates barriers for the integration of LCVs on the state highway system, as staging areas would be required to avoid local roads if local opposition or resolutions forbade the use of LCVs on local roadways. Therefore, a potential LCV system would likely require direct dedicated access to staging areas where trucks could be converted to and from LCV configurations.

The purpose of this evaluation is to determine whether toll revenue can be enhanced through productivity gains by allowing LCVs on dedicated facilities to offset the cost of a toll. Two different methods were used to evaluate this potential market. The first approach, which is similar to the approach utilized for the *I-15 Comprehensive Corridor Study* prepared for SCAG, SANBAG and Caltrans (December, 2005), evaluates commodity-specific information to determine the potential LCV market on the premise that only specific commodities would benefit from a longer vehicle combination. The commodity-specific approach is used to identify trips of more than 100 miles to and from the study area and primarily trips defined as domestic, as well as secondary trips in and out of the region. The second approach evaluates the international container market through the ports of Long Beach and Los Angeles, and focuses specifically on the portion of trips that stay within the region, specifically first order trips between the port and staging areas.

CONTAINER FEES- The revenue generation potential of container fees was also investigated. For the purposes of this study, two scenarios for potential bonding capacity were evaluated, each based on container fees per Forty-Foot Equivalent Unit (FEU). The two scenarios evaluated were:

1. Revenue bonding capacity based on container fees levied for all container movement through the San Pedro Bay ports.
2. Bonding capacity based on container fees levied for only those containers that would travel on a separate facility using an alternative technology.

For the first scenario, three forecasts (low or 12.25 million FEUs, medium or 16.65 million FEUs, and high or 21.25 million FEUs) of container cargo through the San Pedro Bay ports were used, along with a series of container fee levels (per FEU) to calculate potential revenue bonding capacity. Container fees of $10, $20, $30, $40, $50, $100, and $200 per FEU were used.

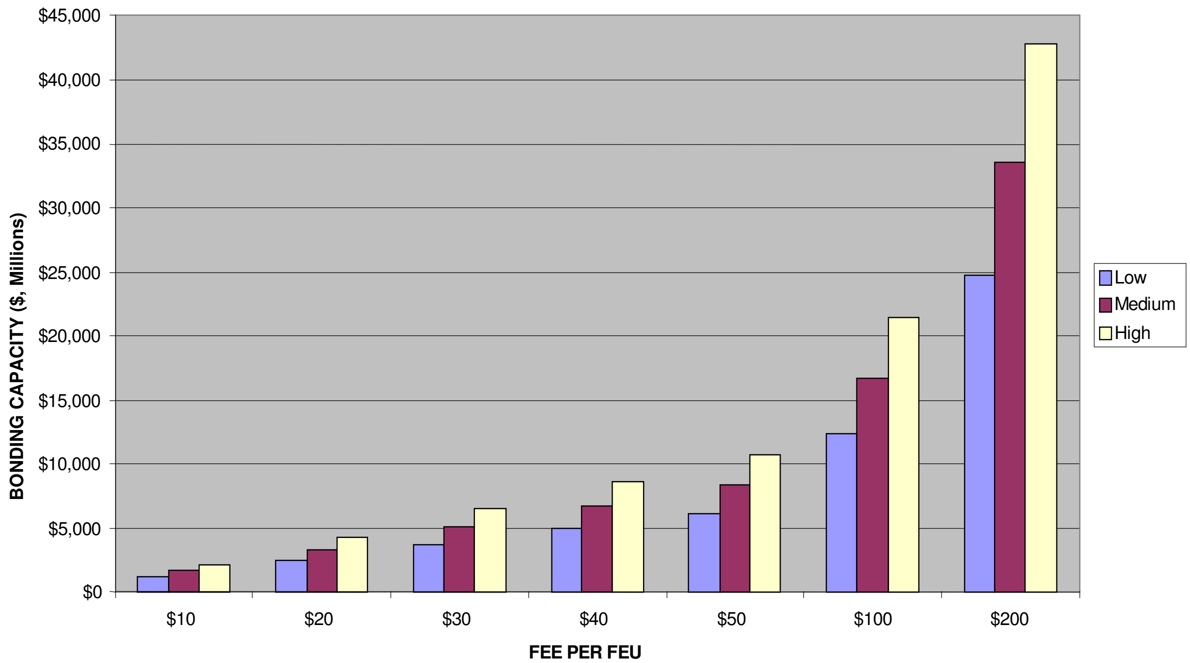
Key assumptions in the estimates of container fees and associated revenue bonding capacity were:

- A debt coverage rate of 1.4 for all projects;
- Bonds were issued at an interest rate of 5.75 percent with a 30 year repayment schedule;
- Transaction fees, debt service costs and debt service reserves were excluded (but would be included in future financial strategy development);
- The level of bond proceeds that could be issued under the truck toll projects was estimated to be roughly equal to 14 times the net revenue available for payment of debt service, with a 1.4 coverage ratio;
- In the absence of a real cost or schedule, the analysis was done in constant dollars. Any future financial strategy development would be based on refined project cost estimates and a proposed project implementation schedule and would be based on year of expenditure dollars.

Using the highest container cargo forecast (42.5 million TEUs, or 21.25 million FEUs) and the highest container fee ($200 per FEU), a bonding capacity of $42.8 billion was estimated. Using the lowest container cargo forecast (24.5 million TEUs, or 12.25 million FEUs) and the lowest container fee ($10 per FEU), a bonding capacity of $1.2 billion was estimated. Figure 53 presents a summary of potential revenue bonding levels and container fees.

Figure 53
POTENTIAL BONDING CAPACITY FROM CONTAINER FEES
RANGE OF CONTAINER (FEU) FEE: $10 - $200 PER FEU
2030 PROJECTION OF TOTAL FEU'S TRAVELING THROUGH PORTS OF LOS ANGELES AND LONG BEACH: LOW, MEDIUM, AND HIGH

(in Millions)

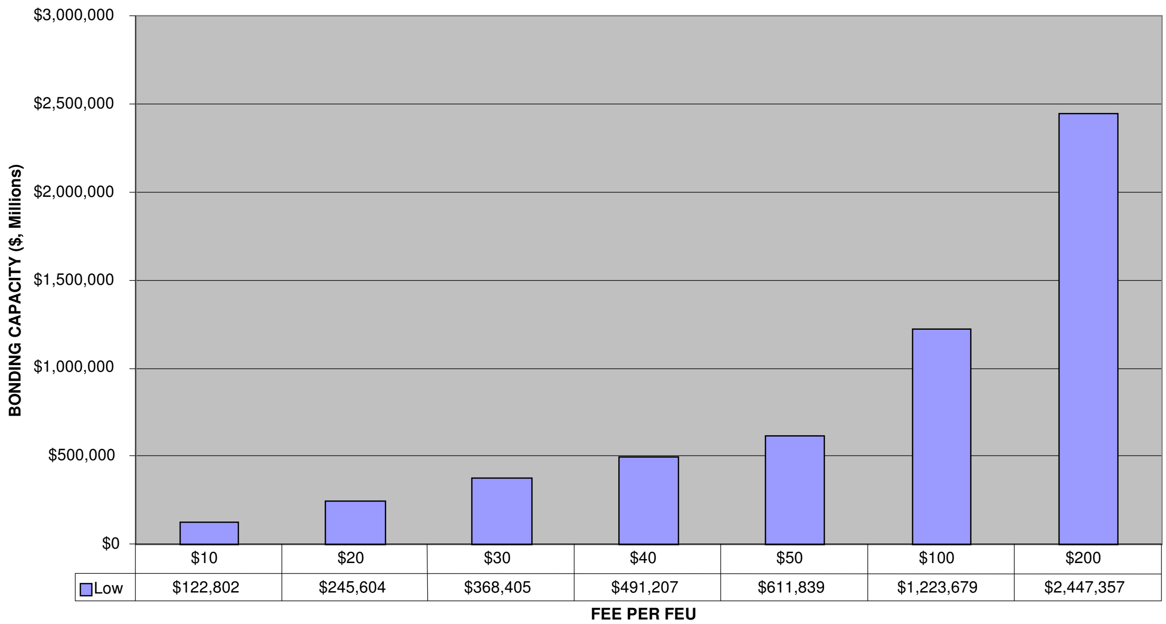


Source: Sharon Greene Associates, 2007

For the second scenario, an alternative technology system connecting the San Pedro Bay ports and an inland staging yard, as described under the modeling of Bundle 11, was used to calculate potential bonding capacity. It was assumed that the alternative technology system would accommodate approximately 1,215,000 FEUs per year (equivalent to the existing Hobart yard). Container fees of $10, $20, $30, $40, $50, $100, and $200 per FEU were used. The analysis showed a potential bonding capacity between $122 million and $2.45 billion, depending on the container fee. Figure 54 presents a summary of bonding capacities and container fees.

Figure 54

POTENTIAL BONDING CAPACITY FROM CONTAINER FEES
RANGE OF FEE PER FEU: $10 - $200 PER FEU
PROJECTED FEU'S USING ALTERNATIVE TECHNOLOGY SYSTEM: 1,215,000
($, 000)



Source: Sharon Greene Associates, 2007

Note that the current fee program proposed by the San Pedro Bay Ports of Los Angeles and Long Beach involves a "pay-as-you-go" program without the need for borrowing. The advantage of this approach is two-fold. First, the project owner/sponsor can avoid substantial borrowing costs such as interest and other financing fees. Second, the term of the fee is reduced, reducing the burden on the project owner/sponsor and on the fee contributors. This approach is especially possible in this specific port area because of the high volumes of container traffic.

Truck Toll Revenue Conclusions

Based on the evaluation of potential revenue generation by truck lane bundles, the following conclusions are made:

- The **greatest toll revenue generation potential** (in terms of truck tolls) would result from a truck lane system that includes both SR-60 (in the eastbound direction) and I-10 (in the westbound direction) as an east-west connection between I-710 and I-15 (approximately $257 million annual toll revenue) allowing for a potential bonding capacity of approximately $3.5 billion; truck lane systems that include SR-60 or I-10 as an east-west connection between I-710 and I-15 provide nearly an equal amount of revenue generating potential (approximately $255 million annual toll revenue) allowing for a potential bonding capacity of approximately $3.5 billion.
- The use of LCVs on dedicated facilities could increase annual revenue generation to $308 million, allowing for a potential bonding capacity of more than $4 billion. Moreover, allowing standard trucks to use the LCV facility will further increase revenues to as much as $500 million annually. (Note that the modeling

methodology used to calculate LCV toll revenue potential did not allow for an accurate analysis of additional revenue potential from non-LCVs using the dedicated facilities.) Developing the LCV facilities from the port to as far as Victorville will maximize its revenue potential by optimally targeting three market segments:

- The long haul LCV market.
- The port container LCV market.
- The remaining standard truck market willing to pay tolls.

Container Fee Conclusions

- Container fees levied on all containers through the San Pedro Bay Ports could allow for a bonding capacity between $1.2 billion and $42.8 billion, depending on the volume of containers and the amount of fee.
- An alternative technology system could impose container fees for those containers using the facility and generate between $122 million and $2.45 billion, depending on the amount of fee.

Truck Lane Cost Estimates

The cost of truck lane systems is required to determine if it could be offset by user financing, and to determine the additional revenues or funding sources that would be needed to support dedicated truck lanes. The cost estimates presented in this chapter were prepared on a macro-level and are for comparison only. Detailed engineering cost estimates of specific facilities could show great variation, particularly in terms of right-of-way acquisition costs between urban and suburban/rural areas. In addition, utility relocation costs or other location-specific costs (e.g., environmental or cultural resource impacts) could substantially impact facility costs.

Based on previous studies, a per lane mile cost for new facility construction is estimated to be between $6.43 million and $32.44 million, as summarized below. The following costs assume new construction, preliminary studies and right-of-way acquisition:

- An evaluation of current planned truck lane projects (excluding preliminary cost estimates for truck lanes on I-710), shows an average cost of $6.43 million per lane-mile.
- An evaluation of all project costs (including truck lanes and mainline additions) shows an average cost of $32.44 million per lane-mile.
- Based on the cost data presented in the Briefing Paper - User-Supported Regional Truckways in Southern California (SCAG, 2004), an average cost of $28.45 million per lane mile was calculated for the regional truck lane system evaluated along I-710, SR-60, and I-15 (from the San Pedro Bay Ports to Barstow).
- It is assumed that given current right-of-way acquisition costs in the urban areas of Southern California, costs of $40 million to $50 million per lane-mile of a new facility would not be unreasonable; therefore, a cost of $45 million per lane-mile is taken as a “theoretical maximum” for truck lane construction.

Based on the cost estimates for truck lane systems, the following conclusions are made:

- The **least costly** truck lane system - I-5 extending from I-710 (near downtown Los Angeles) to the Kern County line.
- The **most costly** truck lane system- I-5 extending from the U.S./Mexico Border to the Kern County line.
  - For the routes extending from the San Pedro Bay Ports to Victorville, the **least costly** would be a truck lane system that includes SR-91 as an east-west connection between I-710 and I-15.
  - For the routes extending from the San Pedro Bay Ports to Victorville, the **most costly** would be a truck lane system that includes SR-91, SR-57, and SR-60 as east-west connections between I-710 and I-15.

Results of Detailed Evaluation

The results of the detailed evaluations will help indicate whether dedicated freight facilities/truck lanes would make a viable transportation option for the study area. Given that there has been strong opposition to plans for implementing dedicated truck lanes, it is recommended that there be a more detailed assessment of the corridors, community and economic impacts, project costs, right-of-way costs and other environmental impacts. Also, it is recommended that alternate non-highway corridors, utility easements, etc., be examined, in addition to the use of clean advanced technologies to transport goods (all of which are presented in the recommended actions in Chapter 7). As such, the following questions and answers are offered to provide more insight on a very controversial topic, as opposed to drawing conclusions on final route selections, cost effectiveness, etc.

- To what extent may dedicated truck lanes (continuous or for selected major subsections of freeway) offer sufficient economic and other benefits (improved efficiency, greater safety/reduced accident costs, improved air quality) in relation to their cost? Would it be a cost-effective investment?
    - In terms of economic benefits, it is clear that additional investment in the transportation system beyond current levels will be required in order to accommodate the forecast growth in container cargo volumes through the San Pedro Bay Ports; otherwise, the system will be constrained and will perform at less than optimal levels. The forecast growth in container cargo will result in increased truck traffic on the MCGMAP Region's highway system. Therefore, not accommodating the additional truck traffic could lead to less than expected growth in container cargo, which could lead to the reduced job creation forecasts discussed above and a related economic impact; conversely, accommodating truck traffic will lead to economic benefits.
    - Truck lanes offer sufficient benefits to be a preferable alternative (in terms of system performance) to operational and safety improvements (including mixed-flow lanes).
    - More detailed information and analyses would be required in order to accurately respond to the question, particularly in the area of air quality improvements and associated costs.
        - Therefore, dedicated truck lanes could offer sufficient economic and efficiency (system performance) benefits, however, subject to demonstration of cost-effectiveness and financial feasibility.

- What portion of dedicated truck lane costs could be offset by user financing, and what additional revenues or funding sources would be needed to support dedicated truck lanes?
    - The response assumes the recommendation of a truck lane system comprised of dedicated truck lanes (2 lanes in each direction) on I-710 (Ports to SR-60), SR-60 (I-710 to I-15), and I-15 (SR-60 to Victorville).
        - Approximately 33 percent to 58 percent of the project cost could be offset by user financing. Container fees could serve as an additional revenue source.

- What policy changes would facilitate or enhance truck lane feasibility? (e.g., LCVs, mandatory use, etc.)?
    - LCV provisions would increase revenue generation potential and would enhance truck lane feasibility; however, a number of concerns regarding safety, legality, etc. would need to be addressed:
        - California does not allow LCVs on its highways.
        - There is local community resistance to the use of LCVs.
        - A separate truck highway facility will need to be constructed with requisite staging areas to allow trucks to build and breakdown the configurations in order to comply with standards on the general purpose system.

        - The port container LCV market will need further innovation to improve the operations of standard container chassis to operate safely as LCV's.

- Can dedicated truck lanes offer sufficient benefits to be a preferable alternative to other ways of accommodating increased freight traffic (such as adding mixed-flow lanes, adding rail capacity, etc.)?
    - Operational and safety improvements (including mixed-flow lanes) would not affect a change in truck travel patterns or volumes.
    - Operational and safety improvements (including mixed-flow lanes) tend to accommodate demand rather than induce increased volumes.
    - Approximately 48 percent of containerized goods move through the region on trucks. Even if rail freight is maximized, a large portion of regional goods will move by truck. Therefore, a means to accommodate truck freight is required.
        - Truck lanes offer sufficient benefits to be a preferable alternative to accommodating increased freight traffic (when focusing on the market segment of freight that travels on the regions roadways), as they would affect the most substantial change on truck travel patterns and volumes on the roadways within the MCGMAP region.
    - An advanced technology corridor could be a viable alternative if land use guidelines and policies are strengthened to encourage warehouse clustering near inland staging areas. (It would also be preferred in terms of minimal environmental impacts.)

- What may be the differential effects of the construction of truck lanes on different freeway segments (i.e. the specific types of benefits and impacts that may occur on different freeway segments, depending on facility location)?
    - The truck lane concepts that include an east-west connection between I-710 and I-15 are the most varied in terms of potential affects on different freeway segments.
    - When examined in terms of some preliminary specific factors (truck volumes, vehicle volumes, changes to congested hours of delay, proximity to schools and residential land uses, and connectivity to warehouse/distribution land uses), a dedicated truck lane system that included SR -60 as an east-west connection between I-710 and I-15 would :
        - Carry the highest truck volumes.
        - Carry very high vehicle volumes
        - Affect the least number of schools
        - Affect the least number of residential land acres
        - Provide the most connectivity to warehouse/distribution land uses.
    - However, no conclusions or recommendations can be drawn regarding a specific route until further analysis that comprehensively evaluates all appropriate factors is conducted.

Note that the analyses and results described in this section were carried out at a regional level. Additional detailed technical analyses at a corridor-level will be required under any formal environmental clearance processes. Therefore, ultimate route selections will depend on subsequent detailed analyses.